



061010 third listing.txt  
SEQUENCE LISTING

<110> Solazyme, Inc.  
Dillon, Harrison F.

<120> Methods and Compositions for Evolving Microbial Hydrogen Production

<130> H2042101-CIP

<140> US 10/763,712

<141> 2004-01-21

<150> US 10/287,750

<151> 2002-11-04

<150> US 10/411,910

<151> 2003-04-12

<150> US 60/500,032

<151> 2003-09-03

<160> 199

<170> PatentIn version 3.2

<210> 1

<211> 574

<212> PRT

<213> Clostridium pasteurianum

<400> 1

Met Lys Thr Ile Ile Ile Asn Gly Val Gln Phe Asn Thr Asp Glu Asp  
1 5 10 15

Thr Thr Ile Leu Lys Phe Ala Arg Asp Asn Asn Ile Asp Ile Ser Ala  
20 25 30

Leu Cys Phe Leu Asn Asn Cys Asn Asn Asp Ile Asn Lys Cys Glu Ile  
35 40 45

Cys Thr Val Glu Val Glu Gly Thr Gly Leu Val Thr Ala Cys Asp Thr  
50 55 60

Leu Ile Glu Asp Gly Met Ile Ile Asn Thr Asn Ser Asp Ala Val Asn  
65 70 75 80

Glu Lys Ile Lys Ser Arg Ile Ser Gln Leu Leu Asp Ile His Glu Phe  
85 90 95

Lys Cys Gly Pro Cys Asn Arg Arg Glu Asn Cys Glu Phe Leu Lys Leu  
100 105 110

Val Ile Lys Tyr Lys Ala Arg Ala Ser Lys Pro Phe Leu Pro Lys Asp  
115 120 125

Lys Thr Glu Tyr Val Asp Glu Arg Ser Lys Ser Leu Thr Val Asp Arg  
130 135 140

Thr Lys Cys Leu Leu Cys Gly Arg Cys Val Asn Ala Cys Gly Lys Asn

145                      150                      155                      160  
 Thr Glu Thr Tyr Ala Met Lys Phe Leu Asn Lys Asn Gly Lys Thr Ile  
                                  165                                   170                                   175  
 Ile Gly Ala Glu Asp Glu Lys Cys Phe Asp Asp Thr Asn Cys Leu Leu  
                                  180                                   185                                   190  
 Cys Gly Gln Cys Ile Ile Ala Cys Pro Val Ala Ala Leu Ser Glu Lys  
                                  195                                   200                                   205  
 Ser His Met Asp Arg Val Lys Asn Ala Leu Asn Ala Pro Glu Lys His  
                                  210                                   215                                   220  
 Val Ile Val Ala Met Ala Pro Ser Val Arg Ala Ser Ile Gly Glu Leu  
                                  225                                   230                                   235                                   240  
 Phe Asn Met Gly Phe Gly Val Asp Val Thr Gly Lys Ile Tyr Thr Ala  
                                  245                                   250                                   255  
 Leu Arg Gln Leu Gly Phe Asp Lys Ile Phe Asp Ile Asn Phe Gly Ala  
                                  260                                   265                                   270  
 Asp Met Thr Ile Met Glu Glu Ala Thr Glu Leu Val Gln Arg Ile Glu  
                                  275                                   280                                   285  
 Asn Asn Gly Pro Phe Pro Met Phe Thr Ser Cys Cys Pro Gly Trp Val  
                                  290                                   295                                   300  
 Arg Gln Ala Glu Asn Tyr Tyr Pro Glu Leu Leu Asn Asn Leu Ser Ser  
                                  305                                   310                                   315                                   320  
 Ala Lys Ser Pro Gln Gln Ile Phe Gly Thr Ala Ser Lys Thr Tyr Tyr  
                                  325                                   330                                   335  
 Pro Ser Ile Ser Gly Leu Asp Pro Lys Asn Val Phe Thr Val Thr Val  
                                  340                                   345                                   350  
 Met Pro Cys Thr Ser Lys Lys Phe Glu Ala Asp Arg Pro Gln Met Glu  
                                  355                                   360                                   365  
 Lys Asp Gly Leu Arg Asp Ile Asp Ala Val Ile Thr Thr Arg Glu Leu  
                                  370                                   375                                   380  
 Ala Lys Met Ile Lys Asp Ala Lys Ile Pro Phe Ala Lys Leu Glu Asp  
                                  385                                   390                                   395                                   400  
 Ser Glu Ala Asp Pro Ala Met Gly Glu Tyr Ser Gly Ala Gly Ala Ile  
                                  405                                   410                                   415  
 Phe Gly Ala Thr Gly Gly Val Met Glu Ala Ala Leu Arg Ser Ala Lys  
                                  420                                   425                                   430

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Asp Phe Ala Glu Asn Ala Glu Leu Glu Asp Ile Glu Tyr Lys Gln Val  
435 440 445

Arg Gly Leu Asn Gly Ile Lys Glu Ala Glu Val Glu Ile Asn Asn Asn  
450 455 460

Lys Tyr Asn Val Ala Val Ile Asn Gly Ala Ser Asn Leu Phe Lys Phe  
465 470 475 480

Met Lys Ser Gly Met Ile Asn Glu Lys Gln Tyr His Phe Ile Glu Val  
485 490 495

Met Ala Cys His Gly Gly Cys Val Asn Gly Gly Gly Gln Pro His Val  
500 505 510

Asn Pro Lys Asp Leu Glu Lys Val Asp Ile Lys Lys Val Arg Ala Ser  
515 520 525

Val Leu Tyr Asn Gln Asp Glu His Leu Ser Lys Arg Lys Ser His Glu  
530 535 540

Asn Thr Ala Leu Val Lys Met Tyr Gln Asn Tyr Phe Gly Lys Pro Gly  
545 550 555 560

Glu Gly Arg Ala His Glu Ile Leu His Phe Lys Tyr Lys Lys  
565 570

<210> 2  
<211> 421  
<212> PRT  
<213> Desulfovibrio vulgaris

<400> 2

Met Ser Arg Thr Val Met Glu Arg Ile Glu Tyr Glu Met His Thr Pro  
1 5 10 15

Asp Pro Lys Ala Asp Pro Asp Lys Leu His Phe Val Gln Ile Asp Glu  
20 25 30

Ala Lys Cys Ile Gly Cys Asp Thr Cys Ser Gln Tyr Cys Pro Thr Ala  
35 40 45

Ala Ile Phe Gly Glu Met Gly Glu Pro His Ser Ile Pro His Ile Glu  
50 55 60

Ala Cys Ile Asn Cys Gly Gln Cys Leu Thr His Cys Pro Glu Asn Ala  
65 70 75 80

Ile Tyr Glu Ala Gln Ser Trp Val Pro Glu Val Glu Lys Lys Leu Lys  
85 90 95

Asp Gly Lys Val Lys Cys Ile Ala Met Pro Ala Pro Ala Val Arg Tyr  
100 105 110

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Ala Leu Gly Asp Ala Phe Gly Met Pro Val Gly Ser Val Thr Thr Gly  
115 120 125

Lys Met Leu Ala Ala Leu Gln Lys Leu Gly Phe Ala His Cys Trp Asp  
130 135 140

Thr Glu Phe Thr Ala Asp Val Thr Ile Trp Glu Glu Gly Ser Glu Phe  
145 150 155 160

Val Glu Arg Leu Thr Lys Lys Ser Asp Met Pro Leu Pro Gln Phe Thr  
165 170 175

Ser Cys Cys Pro Gly Trp Gln Lys Tyr Ala Glu Thr Tyr Tyr Pro Glu  
180 185 190

Leu Leu Pro His Phe Ser Thr Cys Lys Ser Pro Ile Gly Met Asn Gly  
195 200 205

Ala Leu Ala Lys Thr Tyr Gly Ala Glu Arg Met Lys Tyr Asp Pro Lys  
210 215 220

Gln Val Tyr Thr Val Ser Ile Met Pro Cys Ile Ala Lys Lys Tyr Glu  
225 230 235 240

Gly Leu Arg Pro Glu Leu Lys Ser Ser Gly Met Arg Asp Ile Asp Ala  
245 250 255

Thr Leu Thr Thr Arg Glu Leu Ala Tyr Met Ile Lys Lys Ala Gly Ile  
260 265 270

Asp Phe Ala Lys Leu Pro Asp Gly Lys Arg Asp Ser Leu Met Gly Glu  
275 280 285

Ser Thr Gly Gly Ala Thr Ile Phe Gly Val Thr Gly Gly Val Met Glu  
290 295 300

Ala Ala Leu Arg Phe Ala Tyr Glu Ala Val Thr Gly Lys Lys Pro Asp  
305 310 315 320

Ser Trp Asp Phe Lys Ala Val Arg Gly Leu Asp Gly Ile Lys Glu Ala  
325 330 335

Thr Val Asn Val Gly Gly Thr Asp Val Lys Val Ala Val Val His Gly  
340 345 350

Ala Lys Arg Phe Lys Gln Val Cys Asp Asp Val Lys Ala Gly Lys Ser  
355 360 365

Pro Tyr His Phe Ile Glu Tyr Met Ala Cys Pro Gly Gly Cys Val Cys  
370 375 380



Gly Gly Gly Gln Pro Val Met Pro Gly Val Leu Glu Ala Met Asp Arg  
 385 390 395 400

Thr Thr Thr Arg Leu Tyr Ala Gly Leu Lys Lys Arg Leu Ala Met Ala  
 405 410 415

Ser Ala Asn Lys Ala  
 420

<210> 3  
 <211> 468  
 <212> PRT  
 <213> Entamoeba histolytica

<400> 3

Met Pro Pro Lys Pro Ser His Thr Leu Thr Gly His Asp His Asn His  
 1 5 10 15

Ser Ile Gln Phe Asp Trp Ser Lys Cys Met Gly Cys Gly Met Cys Ala  
 20 25 30

Thr Lys Cys Thr Phe Gly Val Leu Val Lys Gln Pro Pro Lys Ile Pro  
 35 40 45

Pro Phe Val Gln Pro Asn Arg Glu Lys Leu Ser Gln Glu Asn Thr Asp  
 50 55 60

Lys Thr Arg Val Leu Ile Asp Glu Ser Glu Cys Thr Gly Cys Gly Gln  
 65 70 75 80

Cys Ser Leu Val Cys Asn Phe Gly Ser Ile Thr Pro Ile Asp His Leu  
 85 90 95

Val Asp Thr Phe Lys Ala Lys Glu Ala Gly Lys Lys Leu Val Ala Met  
 100 105 110

Ile Ala Pro Ser Thr Arg Leu Gly Val Ala Glu Ala Met Gly Met Pro  
 115 120 125

Ile Gly Ser Thr Ala Met Ala Gln Leu Val His Cys Leu Arg Leu Ile  
 130 135 140

Gly Phe Asp Tyr Val Phe Asp Val Asp Ala Gly Ala Asp Lys Thr Thr  
 145 150 155 160

Met Asp Asp Tyr Ala Glu Val Ile Glu Met Lys Lys Glu Gly Lys Gly  
 165 170 175

Pro Ala Ile Thr Ser Cys Cys Pro Ala Trp Ile Glu Leu Val Glu Lys  
 180 185 190

Glu Tyr Pro Asp Leu Ile Pro Asn Val Ser Thr Ala Arg Ser Pro Ile  
 195 200 205

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Gly Cys Leu Ala Gly Cys Ile Lys Arg Gly Trp Ala Lys Asp Val Gly  
210 215 220

Ile Ala Val Glu Asp Leu Tyr Thr Val Gly Ile Met Pro Cys Ile Ala  
225 230 235 240

Lys Lys Thr Glu Ser Gln Arg Gln Gln Ile His Gln Asp Tyr Asp Ala  
245 250 255

Ser Cys Thr Ser Asn Glu Ile Ala Ala Tyr Phe Lys Lys His Leu Pro  
260 265 270

Pro Glu Glu Cys Lys Phe Thr Gln Glu Arg Glu Glu Ala Leu Ala Lys  
275 280 285

Thr Glu Asp Gly Gln Cys Asp Leu Pro Phe Arg Arg Ile Ser Gly Gly  
290 295 300

Ser Asn Ile Phe Gly Lys Thr Gly Gly Val Cys Glu Thr Val Leu Arg  
305 310 315 320

Val Ile Ala Arg Asn Ala Gly Val Asp Trp Asn Ser Cys Thr Val Asn  
325 330 335

Lys Glu Glu Thr Phe Lys His Ala Ala Ser Gly Ser Thr Met Thr Asn  
340 345 350

Leu Ser Val Asp Ile Gly Gly Thr Ile Ile Thr Gly Ala Val Cys His  
355 360 365

Gly Gly Tyr Ala Ile Arg His Ala Cys Glu Leu Ile Arg Lys Gly Glu  
370 375 380

Leu Lys Val Asp Val Val Glu Met Met Ala Cys Val Gly Gly Cys Leu  
385 390 395 400

Gly Gly Ala Gly Gln Pro Lys Ile Pro Pro Ala Lys Lys Leu Glu Met  
405 410 415

Asp Lys Arg Arg Val Met Leu Asp Ile Leu Asp Gln Gln Thr Asp Ile  
420 425 430

Arg Ala Ala Asn Glu Asn Thr Asp Val Leu Gly Trp Ile Asp Lys His  
435 440 445

Phe Asp His Gln Gly Ala His Gln His Leu His Thr Tyr Phe Thr Pro  
450 455 460

Arg Tyr Gln Asn  
465

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<211> 491  
 <212> PRT  
 <213> *Saccharomyces cerevisiae*  
 <400> 4

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Met Ser Ala Leu Leu Ser Glu Ser Asp Leu Asn Asp Phe Ile Ser Pro
1          5          10          15

Ala Leu Ala Cys Val Lys Pro Thr Gln Val Ser Gly Gly Lys Lys Asp
          20          25          30

Asn Val Asn Met Asn Gly Glu Tyr Glu Val Ser Thr Glu Pro Asp Gln
          35          40          45

Leu Glu Lys Val Ser Ile Thr Leu Ser Asp Cys Leu Ala Cys Ser Gly
          50          55          60

Cys Ile Thr Ser Ser Glu Glu Ile Leu Leu Ser Ser Gln Ser His Ser
65          70          75          80

Val Phe Leu Lys Asn Trp Gly Lys Leu Ser Gln Gln Gln Asp Lys Phe
          85          90          95

Leu Val Val Ser Val Ser Pro Gln Cys Arg Leu Ser Leu Ala Gln Tyr
          100          105          110

Tyr Gly Leu Thr Leu Glu Ala Ala Asp Leu Cys Leu Met Asn Phe Phe
          115          120          125

Gln Lys His Phe Gln Cys Lys Tyr Met Val Gly Thr Glu Met Gly Arg
          130          135          140

Ile Ile Ser Ile Ser Lys Thr Val Glu Lys Ile Ile Ala His Lys Lys
145          150          155          160

Gln Lys Glu Asn Thr Gly Ala Asp Arg Lys Pro Leu Leu Ser Ala Val
          165          170          175

Cys Pro Gly Phe Leu Ile Tyr Thr Glu Lys Thr Lys Pro Gln Leu Val
          180          185          190

Pro Met Leu Leu Asn Val Lys Ser Pro Gln Gln Ile Thr Gly Ser Leu
          195          200          205

Ile Arg Ala Thr Phe Glu Ser Leu Ala Ile Ala Arg Glu Ser Phe Tyr
          210          215          220

His Leu Ser Leu Met Pro Cys Phe Asp Lys Lys Leu Glu Ala Ser Arg
225          230          235          240

Pro Glu Ser Leu Asp Asp Gly Ile Asp Cys Val Ile Thr Pro Arg Glu
          245          250          255
    
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Ile Val Thr Met Leu Gln Glu Leu Asn Leu Asp Phe Lys Ser Phe Leu  
260 265 270

Thr Glu Asp Thr Ser Leu Tyr Gly Arg Leu Ser Pro Pro Gly Trp Asp  
275 280 285

Pro Arg Val His Trp Ala Ser Asn Leu Gly Gly Thr Cys Gly Gly Tyr  
290 295 300

Ala Tyr Gln Tyr Val Thr Ala Val Gln Arg Leu His Pro Gly Ser Gln  
305 310 315 320

Met Ile Val Leu Glu Gly Arg Asn Ser Asp Ile Val Glu Tyr Arg Leu  
325 330 335

Leu His Asp Asp Arg Ile Ile Ala Ala Ala Ser Glu Leu Ser Gly Phe  
340 345 350

Arg Asn Ile Gln Asn Leu Val Arg Lys Leu Thr Ser Gly Ser Gly Ser  
355 360 365

Glu Arg Lys Arg Asn Ile Thr Ala Leu Arg Lys Arg Arg Thr Gly Pro  
370 375 380

Lys Ala Asn Ser Arg Glu Met Ala Ala Ala Thr Ala Ala Thr Ala Asp  
385 390 395 400

Pro Tyr His Ser Asp Tyr Ile Glu Val Asn Ala Cys Pro Gly Ala Cys  
405 410 415

Met Asn Gly Gly Gly Leu Leu Asn Gly Glu Gln Asn Ser Leu Lys Arg  
420 425 430

Lys Gln Leu Val Gln Thr Leu Asn Lys Arg His Gly Glu Glu Leu Ala  
435 440 445

Met Val Asp Pro Leu Thr Leu Gly Pro Lys Leu Glu Glu Ala Ala Ala  
450 455 460

Arg Pro Leu Ser Leu Glu Tyr Val Phe Ala Pro Val Lys Gln Ala Val  
465 470 475 480

Glu Lys Asp Leu Val Ser Val Gly Ser Thr Trp  
485 490

<210> 5  
<211> 436  
<212> PRT  
<213> Chlorella fusca

<400> 5

Met Cys Cys Pro Val Val Ala Ser Arg His Ala Gly Arg Ala Arg His  
1 5 10 15

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Val Ala Val Arg Ala Ala Gly Pro Thr Ser Glu Cys Asp Cys Pro Pro  
 20 25 30  
 Thr Pro Gln Ala Lys Leu Pro His Trp Gln Gln Ala Leu Asp Glu Leu  
 35 40 45  
 Ala Lys Pro Lys Glu Ser Arg Arg Leu Met Ile Ala Gln Ile Ala Ser  
 50 55 60  
 Ala Val Arg Val Ala Ile Ala Glu Thr Ile Gly Leu Ala Pro Gly Asp  
 65 70 75 80  
 Val Thr Ile Gly Gln Leu Val Thr Gly Leu Arg Met Leu Gly Phe Asp  
 85 90 95  
 Tyr Val Phe Asp Thr Leu Phe Gly Ala Asp Leu Thr Ile Met Glu Glu  
 100 105 110  
 Gly Thr Glu Leu Leu His Arg Leu Gln Asp His Leu Glu Gln His Pro  
 115 120 125  
 Asn Lys Glu Glu Pro Leu Pro Met Phe Thr Ser Cys Cys Pro Gly Trp  
 130 135 140  
 Val Ala Met Val Glu Lys Ser Asn Pro Glu Leu Ile Pro Tyr Leu Ser  
 145 150 155 160  
 Ser Cys Lys Ser Pro Gln Met Met Leu Gly Ala Val Ile Lys Asn Tyr  
 165 170 175  
 Tyr Ala Gln Gln Val Gly Val Gln Pro Ser Asp Ile Cys Asn Val Ser  
 180 185 190  
 Val Met Pro Cys Val Arg Lys Gln Gly Glu Ala Asp Arg Glu Trp Phe  
 195 200 205  
 Asn Thr Thr Gly Ala Gly Leu Ala Arg Asp Val Asp His Val Val Thr  
 210 215 220  
 Thr Ala Glu Val Gly Lys Ile Phe Leu Glu Arg Gly Ile Lys Leu Asn  
 225 230 235 240  
 Glu Leu Pro Glu Ser Asn Phe Asp Asn Pro Ile Gly Glu Gly Thr Gly  
 245 250 255  
 Gly Ala Leu Leu Phe Gly Thr Thr Gly Gly Val Met Glu Ala Ala Leu  
 260 265 270  
 Arg Thr Val Tyr Glu Val Val Thr Gln Lys Pro Met Gly Arg Val Asp  
 275 280 285  
 Phe Glu Glu Val Arg Gly Leu Glu Gly Ile Lys Glu Ala Glu Ile Thr

290

295

Leu Lys Pro Gly Asp Asp Ser Pro Phe Lys Ala Phe Ala Gly Ala Asp  
305 310 315 320

Gly Gln Gly Ile Thr Leu Lys Ile Ala Val Ala Asn Gly Leu Gly Asn  
325 330 335

Ala Lys Lys Leu Ile Lys Ser Leu Ser Glu Gly Lys Ala Lys Tyr Asp  
340 345 350

Phe Ile Glu Val Met Ala Cys Pro Gly Gly Cys Ile Gly Gly Gly Gly  
355 360 365

Gln Pro Arg Ser Thr Asp Lys Gln Ile Leu Gln Lys Arg Gln Gln Ala  
370 375 380

Met Tyr Asn Leu Asp Glu Arg Ser Thr Ile Arg Arg Ser His Asp Asn  
385 390 395 400

Pro Phe Ile Gln Ala Leu Tyr Asp Lys Phe Leu Gly Ala Pro Asn Ser  
405 410 415

His Lys Ala His Asp Leu Leu His Thr His Tyr Val Ala Gly Gly Ile  
420 425 430

Pro Glu Glu Lys  
435

<210> 6  
<211> 574  
<212> PRT  
<213> Clostridium saccharobutylicum  
<400> 6

Met Ile Asn Ile Val Ile Asp Glu Lys Thr Ile Gln Val Gln Glu Asn  
1 5 10 15

Thr Thr Val Ile Gln Ala Ala Leu Ala Asn Gly Ile Asp Ile Pro Ser  
20 25 30

Leu Cys Tyr Leu Asn Glu Cys Gly Asn Val Gly Lys Cys Gly Val Cys  
35 40 45

Ala Val Glu Ile Glu Gly Lys Asn Asn Leu Ala Leu Ala Cys Ile Thr  
50 55 60

Lys Val Glu Glu Gly Met Val Val Lys Thr Asn Ser Glu Lys Val Gln  
65 70 75 80

Glu Arg Val Lys Met Arg Val Ala Thr Leu Leu Asp Lys His Glu Phe  
85 90 95

Lys Cys Gly Pro Cys Pro Arg Arg Glu Asn Cys Glu Phe Leu Lys Leu  
 100 105 110  
 Val Ile Lys Thr Lys Ala Lys Ala Asn Lys Pro Phe Val Val Glu Asp  
 115 120 125  
 Lys Ser Gln Tyr Ile Asp Ile Arg Ser Lys Ser Ile Val Ile Asp Arg  
 130 135 140  
 Thr Lys Cys Val Leu Cys Gly Arg Cys Glu Ala Ala Cys Lys Thr Lys  
 145 150 155 160  
 Thr Gly Thr Gly Ala Ile Ser Ile Cys Lys Ser Glu Ser Gly Arg Ile  
 165 170 175  
 Val Gln Ala Thr Gly Gly Lys Cys Phe Asp Asp Thr Asn Cys Leu Leu  
 180 185 190  
 Cys Gly Gln Cys Val Ala Ala Cys Pro Val Gly Ala Leu Thr Glu Lys  
 195 200 205  
 Thr His Val Asp Arg Val Lys Glu Ala Leu Glu Asp Pro Asn Lys His  
 210 215 220  
 Val Ile Val Ala Met Ala Pro Ser Ile Arg Thr Ser Met Gly Glu Leu  
 225 230 235 240  
 Phe Lys Leu Gly Tyr Gly Val Asp Val Thr Gly Lys Leu Tyr Ala Ser  
 245 250 255  
 Met Arg Ala Leu Gly Phe Asp Lys Val Phe Asp Ile Asn Phe Gly Ala  
 260 265 270  
 Asp Met Thr Ile Met Glu Glu Ala Thr Glu Phe Ile Glu Arg Val Lys  
 275 280 285  
 Asn Asn Gly Pro Phe Pro Met Phe Thr Ser Cys Cys Pro Ala Trp Val  
 290 295 300  
 Arg Gln Val Glu Asn Tyr Tyr Pro Glu Phe Leu Glu Asn Leu Ser Ser  
 305 310 315 320  
 Ala Lys Ser Pro Gln Gln Ile Phe Gly Ala Ala Ser Lys Thr Tyr Tyr  
 325 330 335  
 Pro Gln Ile Ser Gly Ile Ser Ala Lys Asp Val Phe Thr Val Thr Ile  
 340 345 350  
 Met Pro Cys Thr Ala Lys Lys Phe Glu Ala Asp Arg Glu Glu Met Tyr  
 355 360 365  
 Asn Glu Gly Ile Lys Asn Ile Asp Ala Val Leu Thr Thr Arg Glu Leu  
 370 375 380

Ala Lys Met Ile Lys Asp Ala Lys Ile Asn Phe Ala Asn Leu Glu Asp  
385 390 395 400

Glu Gln Ala Asp Pro Ala Met Gly Glu Tyr Thr Gly Ala Gly Val Ile  
405 410 415

Phe Gly Ala Thr Gly Gly Val Met Glu Ala Ala Leu Arg Thr Ala Lys  
420 425 430

Asp Phe Val Glu Asp Lys Asp Leu Thr Asp Ile Glu Tyr Thr Gln Ile  
435 440 445

Arg Gly Leu Gln Gly Ile Lys Glu Ala Thr Val Glu Ile Gly Gly Glu  
450 455 460

Asn Tyr Asn Val Ala Val Ile Asn Gly Ala Ala Asn Leu Ala Glu Phe  
465 470 475 480

Met Asn Ser Gly Lys Ile Leu Glu Lys Asn Tyr His Phe Ile Glu Val  
485 490 495

Met Ala Cys Pro Gly Gly Cys Val Asn Gly Gly Gly Gln Pro His Val  
500 505 510

Ser Ala Lys Glu Arg Glu Lys Val Asp Val Arg Thr Val Arg Ala Ser  
515 520 525

Val Leu Tyr Asn Gln Asp Lys Asn Leu Glu Lys Arg Lys Ser His Lys  
530 535 540

Asn Thr Ala Leu Leu Asn Met Tyr Tyr Asp Tyr Met Gly Ala Pro Gly  
545 550 555 560

Gln Gly Lys Ala His Glu Leu Leu His Leu Lys Tyr Asn Lys  
565 570

<210> 7

<211> 421

<212> PRT

<213> Desulfovibrio vulgaris

<400> 7

Met Ser Arg Ile Glu Met Glu Lys Ile Phe Tyr Glu Asp His Ala Pro  
1 5 10 15

Asp Pro Lys Ala Asp Pro Asp Lys Leu Phe Phe Ile Gln Ile Asp Glu  
20 25 30

Ser Lys Cys Ile Gly Cys Asp Ser Cys Gln Gln Tyr Cys Pro Thr Gly  
35 40 45

Ala Ile Phe Gly Asp Thr Gly Asp Ala His Lys Ile Pro His Glu Glu



50

55

60

Leu Cys Ile Asn Cys Gly Gln Cys Leu Thr His Cys Pro Val Gly Ala  
65 70 75 80

Ile Tyr Glu Ser Gln Ser Trp Val Thr Glu Ile Glu Lys Lys Ile Lys  
85 90 95

Ala Lys Asp Val Lys Val Ile Ala Met Pro Ala Pro Ala Val Arg Tyr  
100 105 110

Ala Leu Gly Asp Ala Phe Gly Leu Pro Val Gly Thr Val Thr Thr Gly  
115 120 125

Lys Met Phe Ser Ala Leu Lys Glu Leu Gly Phe Asp His Cys Trp Asp  
130 135 140

Asn Glu Phe Thr Ala Asp Val Thr Ile Trp Glu Glu Gly Thr Glu Phe  
145 150 155 160

Val Gln Arg Leu Thr Lys Lys Leu Asp Lys Pro Leu Pro Gln Phe Thr  
165 170 175

Ser Cys Cys Pro Gly Trp His Lys Tyr Val Glu Ser Leu Tyr Pro Glu  
180 185 190

Leu Phe Pro His Met Ser Ser Cys Lys Ser Pro Ile Gly Met Leu Gly  
195 200 205

Thr Leu Ala Lys Thr Tyr Gly Ala Asp Arg Met Lys Tyr Asp Arg Ala  
210 215 220

Lys Val Tyr Thr Val Ser Ile Met Pro Cys Thr Ala Lys Lys Tyr Glu  
225 230 235 240

Gly Met Arg Pro Gln Leu Trp Asp Ser Gly His Lys Asp Ile Asp Ala  
245 250 255

Thr Ile Asp Thr Arg Glu Leu Ala Tyr Met Ile Lys Lys Ala Lys Ile  
260 265 270

Asp Phe Thr Lys Leu Pro Asp Gly Lys Arg Asp Thr Leu Met Gly Glu  
275 280 285

Ser Thr Gly Gly Ala Thr Leu Phe Gly Val Thr Gly Gly Val Met Glu  
290 295 300

Ala Ala Leu Arg Tyr Ala Tyr Gln Ala Val Thr Gly Lys Lys Pro Glu  
305 310 315 320

Ser Met Asp Phe Lys Gly Val Arg Gly Leu Gln Gly Val Lys Glu Ala  
325 330 335

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Thr Val Asn Val Gly Gly Val Asp Val Lys Val Ala Val Val His Gly  
340 345 350

Ala Arg Arg Phe His Asp Val Cys Glu Leu Val Lys Ala Gly Lys Ala  
355 360 365

Pro Trp His Phe Ile Glu Phe Met Ala Cys Pro Gly Gly Cys Val Cys  
370 375 380

Gly Gly Gly Gln Pro Val Met Pro Gly Val Leu Glu Ala Ala Asp Arg  
385 390 395 400

Arg Ser Thr Arg Met Tyr Ala Gly Leu Lys Lys Arg Leu Ala Met Ala  
405 410 415

Ser Ala Ser Arg Ala  
420

<210> 8  
<211> 124  
<212> PRT  
<213> Desulfovibrio vulgaris  
<400> 8

Met Gln Ile Val Asn Leu Thr Arg Arg Gly Phe Leu Lys Ala Ala Cys  
1 5 10 15

Val Val Thr Gly Gly Ala Leu Ile Ser Ile Arg Met Thr Gly Lys Ala  
20 25 30

Val Ala Ala Ala Lys Gln Leu Lys Asp Tyr Met Met Asp Arg Ile Asn  
35 40 45

Gly Val Tyr Gly Ala Asp Ala Lys Phe Pro Val Arg Ala Ser Gln Asp  
50 55 60

Asn Val Gln Val Gln Lys Leu Tyr Ala Asp Phe Leu Glu Lys Pro Met  
65 70 75 80

Ser His Lys Ala Glu Gln Leu Leu His Thr His Trp Val Asp Arg Ser  
85 90 95

Lys Ala Ile Glu Arg Met Lys Ala Gln Gly Ala Tyr Pro Asn Pro Arg  
100 105 110

Ala Lys Glu Phe Glu Gly Asn Thr Tyr Pro Tyr Glu  
115 120

<210> 9  
<211> 606  
<212> PRT  
<213> Desulfovibrio vulgaris  
<400> 9

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Met Asn Ala Phe Ile Asn Gly Lys Glu Val Arg Cys Glu Pro Gly Arg  
1 5 10 15

Thr Ile Leu Glu Ala Ala Arg Glu Asn Gly His Phe Ile Pro Thr Leu  
20 25 30

Cys Glu Leu Ala Asp Ile Gly His Ala Pro Gly Thr Cys Arg Val Cys  
35 40 45

Leu Val Glu Ile Trp Arg Asp Lys Glu Ala Gly Pro Gln Ile Val Thr  
50 55 60

Ser Cys Thr Thr Pro Val Glu Glu Gly Met Arg Ile Phe Thr Arg Thr  
65 70 75 80

Pro Glu Val Arg Arg Met Gln Arg Leu Gln Val Glu Leu Leu Leu Ala  
85 90 95

Asp His Asp His Asp Cys Ala Ala Cys Ala Arg His Gly Asp Cys Glu  
100 105 110

Leu Gln Asp Val Ala Gln Phe Val Gly Leu Thr Gly Thr Arg His His  
115 120 125

Phe Pro Asp Tyr Ala Arg Ser Arg Thr Arg Asp Val Ser Ser Pro Ser  
130 135 140

Val Val Arg Asp Met Gly Lys Cys Ile Arg Cys Leu Arg Cys Val Ala  
145 150 155 160

Val Cys Arg Asn Val Gln Gly Val Asp Ala Leu Val Val Thr Gly Asn  
165 170 175

Gly Ile Gly Thr Glu Ile Gly Leu Arg His Asn Arg Ser Gln Ser Ala  
180 185 190

Ser Asp Cys Val Gly Cys Gly Gln Cys Thr Leu Val Cys Pro Val Gly  
195 200 205

Ala Leu Ala Gly Arg Asp Asp Val Glu Arg Val Ile Asp Tyr Leu Tyr  
210 215 220

Asp Pro Glu Ile Val Thr Val Phe Gln Phe Ala Pro Ala Val Arg Val  
225 230 235 240

Gly Leu Gly Glu Glu Phe Gly Leu Pro Pro Gly Ser Ser Val Glu Gly  
245 250 255

Gln Val Pro Thr Ala Leu Arg Leu Leu Gly Ala Asp Val Val Leu Asp  
260 265 270

Thr Asn Phe Ala Ala Asp Leu Val Ile Met Glu Glu Gly Thr Glu Leu

275

280

285

Leu Gln Arg Leu Arg Gly Gly Ala Lys Leu Pro Leu Phe Thr Ser Cys  
 290 295 300

Cys Pro Gly Trp Val Asn Phe Ala Glu Lys His Leu Pro Asp Ile Leu  
 305 310 315 320

Pro His Val Ser Thr Thr Arg Ser Pro Gln Gln Cys Leu Gly Ala Leu  
 325 330 335

Ala Lys Thr Tyr Leu Ala Arg Thr Met Asn Val Ala Pro Glu Arg Met  
 340 345 350

Arg Val Val Ser Leu Met Pro Cys Thr Ala Lys Lys Glu Glu Ala Ala  
 355 360 365

Arg Pro Glu Phe Arg Arg Asp Gly Val Arg Asp Val Asp Ala Val Leu  
 370 375 380

Thr Thr Arg Glu Phe Ala Arg Leu Leu Arg Arg Glu Gly Ile Asp Leu  
 385 390 395 400

Ala Gly Leu Glu Pro Ser Pro Cys Asp Asp Pro Leu Met Gly Arg Ala  
 405 410 415

Thr Gly Ala Ala Val Ile Phe Gly Thr Thr Gly Gly Val Met Glu Ala  
 420 425 430

Ala Leu Arg Thr Val Tyr His Val Leu Asn Gly Lys Glu Leu Ala Pro  
 435 440 445

Val Glu Leu His Ala Leu Arg Gly Tyr Glu Asn Val Arg Glu Ala Val  
 450 455 460

Val Pro Leu Gly Glu Gly Asn Gly Ser Val Lys Val Ala Val Val His  
 465 470 475 480

Gly Leu Lys Ala Ala Arg Gln Met Val Glu Ala Val Leu Ala Gly Lys  
 485 490 495

Ala Asp His Val Phe Val Glu Val Met Ala Cys Pro Gly Gly Cys Met  
 500 505 510

Asp Gly Gly Gly Gln Pro Arg Ser Lys Arg Ala Tyr Asn Pro Asn Ala  
 515 520 525

Gln Ala Arg Arg Ala Ala Leu Phe Ser Leu Asp Ala Glu Asn Ala Leu  
 530 535 540

Arg Gln Ser His Asn Asn Pro Leu Ile Gly Lys Val Tyr Glu Ser Phe  
 545 550 555 560

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Leu Gly Glu Pro Cys Ser Asn Leu Ser His Arg Leu Leu His Thr Arg  
 565 570 575  
 Tyr Gly Asp Arg Lys Ser Glu Val Ala Tyr Thr Met Arg Asp Ile Trp  
 580 585 590  
 His Glu Met Thr Leu Gly Arg Arg Val Arg Gly Asp Ser Asp  
 595 600 605  
 <210> 10  
 <211> 572  
 <212> PRT  
 <213> Clostridium perfringens  
 <400> 10  
 Met Asn Lys Ile Ile Ile Asn Asp Lys Thr Ile Glu Phe Asp Gly Asp  
 1 5 10 15  
 Lys Thr Ile Leu Asp Leu Ala Arg Glu Asn Gly Phe Asp Ile Pro Val  
 20 25 30  
 Leu Cys Glu Leu Lys Asn Cys Gly Asn Lys Gly Gln Cys Gly Val Cys  
 35 40 45  
 Leu Val Glu Gln Glu Gly Asn Asp Arg Leu Leu Arg Ser Cys Ala Ile  
 50 55 60  
 Lys Ala Lys Asp Gly Met Val Ile Lys Thr Asp Ser Glu Lys Val Leu  
 65 70 75 80  
 Glu Ala Arg Lys Glu Arg Val Ala Glu Leu Leu Asp Glu His Glu Phe  
 85 90 95  
 Lys Cys Gly Pro Cys Lys Arg Arg Glu Asn Cys Glu Phe Leu Lys Leu  
 100 105 110  
 Val Ile Lys Thr Lys Ala Arg Ala His Lys Pro Phe Val Val Ala Asp  
 115 120 125  
 Lys Ser Glu Tyr Val Asp Asp Arg Ser Lys Ser Ile Val Leu Asp Arg  
 130 135 140  
 Ser Lys Cys Val Lys Cys Gly Arg Cys Val Ala Ala Cys Arg Thr Arg  
 145 150 155 160  
 Thr Ala Thr Asn Ser Ile Lys Phe His Arg Ile Asp Gly Val Arg Leu  
 165 170 175  
 Val Gly Pro Glu Glu Leu Lys Cys Phe Asp Asp Thr Asn Cys Leu Leu  
 180 185 190  
 Cys Gly Gln Cys Ile Ala Ala Cys Pro Val Asp Ala Leu Ser Glu Lys  
 195 200 205

Ser His Ile Glu Arg Val Gln Glu Ala Leu Asn Asp Pro Glu Lys His  
 210 215 220  
 Val Ile Val Ala Met Ala Pro Ala Val Arg Thr Ser Met Gly Glu Leu  
 225 230 235 240  
 Phe Lys Met Gly Tyr Gly Gln Asp Val Thr Gly Lys Leu Tyr Thr Ala  
 245 250 255  
 Leu Arg Glu Leu Gly Phe Asp Lys Val Phe Asp Ile Asn Phe Gly Ala  
 260 265 270  
 Asp Met Thr Ile Met Glu Glu Ala Thr Glu Leu Ile Glu Arg Ile Lys  
 275 280 285  
 Asn Asn Gly Pro Phe Pro Met Leu Thr Ser Cys Cys Pro Ser Trp Val  
 290 295 300  
 Arg Glu Val Glu Asn Tyr Phe Pro Glu Leu Val Glu Asn Leu Ser Ser  
 305 310 315 320  
 Ala Lys Ser Pro Gln Gln Ile Phe Gly Ala Ala Ser Lys Thr Tyr Tyr  
 325 330 335  
 Pro Gln Val Ala Asp Ile Asp Pro Lys Lys Val Phe Thr Val Thr Val  
 340 345 350  
 Met Pro Cys Thr Ser Lys Lys Phe Glu Ala Asp Arg Pro Glu Met Glu  
 355 360 365  
 Asn Glu Gly Ile Arg Asn Ile Asp Ala Val Ile Thr Thr Arg Glu Leu  
 370 375 380  
 Ala Arg Met Ile Lys Ala Ala Lys Ile Asp Phe Ala Lys Leu Glu Asp  
 385 390 395 400  
 Gly Glu Val Asp Pro Ala Met Gly Glu Tyr Thr Gly Ala Gly Val Ile  
 405 410 415  
 Phe Gly Ala Thr Gly Gly Val Met Glu Ala Ala Leu Arg Thr Ala Lys  
 420 425 430  
 Asp Phe Met Glu Asn Asp Asn Leu Asp Asn Val Asp Tyr Glu Ala Val  
 435 440 445  
 Arg Gly Leu Ala Gly Ile Lys Glu Ala Glu Val Glu Ile Ala Gly Asn  
 450 455 460  
 Glu Tyr Lys Leu Ala Val Val Ser Gly Ala Ala Asn Val Phe Glu Leu  
 465 470 475 480

Val Lys Ser Gly Lys Ile Asn Asp Tyr His Phe Ile Glu Val Met Ala  
 485 490 495

Cys Pro Gly Gly Cys Val Asn Gly Gly Gly Gln Pro His Ile Ser Ala  
 500 505 510

Glu Asp Ser Asp Lys Met Asp Ile Arg Glu Val Arg Ala Ser Val Leu  
 515 520 525

Tyr Asn Gln Asp Lys Asn Leu Glu Lys Arg Lys Ser His Gln Asn Ser  
 530 535 540

Ala Leu Leu Lys Met Tyr Glu Ser Tyr Met Gly Lys Pro Gly His Gly  
 545 550 555 560

Arg Ala His Glu Leu Leu His Met Lys Tyr Lys Lys  
 565 570

<210> 11  
 <211> 572  
 <212> PRT  
 <213> Clostridium perfringens

<400> 11

Met Asn Lys Ile Ile Ile Asn Asp Lys Thr Ile Glu Phe Asp Gly Asp  
 1 5 10 15

Lys Thr Ile Leu Asp Leu Ala Arg Glu Asn Gly Phe Asp Ile Pro Val  
 20 25 30

Leu Cys Glu Leu Lys Asn Cys Gly Asn Lys Gly Gln Cys Gly Val Cys  
 35 40 45

Leu Val Glu Gln Glu Gly Asn Asp Arg Leu Leu Arg Ser Cys Ala Ile  
 50 55 60

Lys Ala Lys Asp Gly Met Val Ile Lys Thr Asp Ser Glu Lys Val Leu  
 65 70 75 80

Glu Ala Arg Lys Glu Arg Val Ala Glu Leu Leu Asp Glu His Glu Phe  
 85 90 95

Lys Cys Gly Pro Cys Lys Arg Arg Glu Asn Cys Glu Phe Leu Lys Leu  
 100 105 110

Val Ile Lys Thr Lys Ala Arg Ala His Lys Pro Phe Val Val Ala Asp  
 115 120 125

Lys Ser Glu Tyr Val Asp Asp Arg Ser Lys Ser Ile Val Leu Asp Arg  
 130 135 140

Ser Lys Cys Val Lys Cys Gly Arg Cys Val Ala Ala Cys Arg Thr Arg  
 145 150 155 160

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Thr Ala Thr Asn Ser Ile Lys Phe His Arg Ile Asp Gly Val Arg Leu  
165 170 175

Val Gly Pro Glu Glu Leu Lys Cys Phe Asp Asp Thr Asn Cys Leu Leu  
180 185 190

Cys Gly Gln Cys Ile Ala Ala Cys Pro Val Asp Ala Leu Ser Glu Lys  
195 200 205

Ser His Ile Glu Arg Val Gln Asp Ala Leu Asn Asp Pro Glu Lys His  
210 215 220

Val Ile Val Ala Met Ala Pro Ala Val Arg Thr Ser Met Gly Glu Leu  
225 230 235 240

Phe Lys Met Gly Tyr Gly Gln Asp Val Thr Gly Lys Leu Tyr Thr Ala  
245 250 255

Leu Arg Glu Leu Gly Phe Asp Lys Val Phe Asp Ile Asn Phe Gly Ala  
260 265 270

Asp Met Thr Ile Met Glu Glu Ala Thr Glu Leu Ile Glu Arg Ile Lys  
275 280 285

Asn Asn Gly Pro Phe Pro Met Leu Thr Ser Cys Cys Pro Ser Trp Val  
290 295 300

Arg Glu Val Glu Asn Tyr Phe Pro Glu Leu Val Glu Asn Leu Ser Ser  
305 310 315 320

Ala Lys Ser Pro Gln Gln Ile Phe Gly Ala Ala Ser Lys Thr Tyr Tyr  
325 330 335

Pro Gln Val Ala Asp Ile Asp Pro Lys Lys Val Phe Thr Val Thr Val  
340 345 350

Met Pro Cys Thr Ser Lys Lys Phe Glu Ala Asp Arg Pro Glu Met Glu  
355 360 365

Asn Glu Gly Ile Arg Asn Ile Asp Ala Val Ile Thr Thr Arg Glu Leu  
370 375 380

Ala Arg Met Ile Lys Ala Ala Lys Ile Asp Phe Ala Lys Leu Glu Asp  
385 390 395 400

Gly Glu Val Asp Pro Ala Met Gly Glu Tyr Thr Gly Ala Gly Val Ile  
405 410 415

Phe Gly Ala Thr Gly Gly Val Met Glu Ala Ala Leu Arg Thr Ala Lys  
420 425 430

Asp Phe Met Glu Asn Asp Asn Leu Asp Asn Val Asp Tyr Glu Ala Val



435

440

445

Arg Gly Leu Ala Gly Ile Lys Glu Ala Glu Val Glu Ile Ala Gly Asn  
 450 455 460

Glu Tyr Lys Leu Ala Val Val Ser Gly Ala Ala Asn Val Phe Glu Leu  
 465 470 475 480

Val Lys Ser Gly Lys Ile Asn Asp Tyr His Phe Ile Glu Val Met Ala  
 485 490 495

Cys Pro Gly Gly Cys Val Asn Gly Gly Gly Gln Pro His Ile Ser Ala  
 500 505 510

Glu Asp Ser Asp Lys Ile Asp Ile Arg Glu Val Arg Ala Ser Val Leu  
 515 520 525

Tyr Asn Gln Asp Lys Asn Leu Glu Lys Arg Lys Ser His Gln Asn Ser  
 530 535 540

Ala Leu Leu Lys Met Tyr Glu Asn Tyr Met Gly Lys Pro Gly His Gly  
 545 550 555 560

Arg Ala His Glu Leu Leu His Met Lys Tyr Lys Lys  
 565 570

<210> 12  
 <211> 484  
 <212> PRT  
 <213> Megasphaera elsdenii

<400> 12

Met Pro Glu Phe His Ser Arg Phe Glu Lys Ile Asp Arg Arg Val Pro  
 1 5 10 15

Ile Asp Glu His Asn Cys Ala Val Gln Phe Asp Val Thr Lys Cys Lys  
 20 25 30

Asn Cys Thr Leu Cys Arg Arg Ala Cys Ala Asp Thr Gln Thr Val Leu  
 35 40 45

Asp Tyr Tyr Ser Leu Ser Ser Thr Gly Asp Met Pro Ile Cys Val His  
 50 55 60

Cys Gly Gln Cys Ser Ser Ala Cys Pro Phe Gly Ala Ile Val Glu Val  
 65 70 75 80

Asn Asp Val Asp Lys Val Lys Ala Ala Leu Lys Asp Pro Glu Lys Ile  
 85 90 95

Val Ile Phe Gln Thr Ala Pro Ala Val Arg Val Gly Leu Gly Glu Ala  
 100 105 110

Phe Gly Met Asp Pro Gly Thr Phe Val Glu Gly Lys Met Val Ala Ala  
 115 120 125  
 Leu Arg Thr Leu Gly Ala Asp Tyr Val Phe Asp Thr Asp Phe Gly Ala  
 130 135 140  
 Asp Leu Thr Ile Met Glu Glu Ala Thr Glu Leu Leu His Arg Leu Gln  
 145 150 155 160  
 Ser Glu Glu Ile Pro Ile Pro Gln Phe Thr Ser Cys Cys Pro Ala Trp  
 165 170 175  
 Val Glu Phe Ala Glu Thr Phe Tyr Pro Asp Leu Leu Gln His Leu Ser  
 180 185 190  
 Ser Thr Lys Ser Pro Ile Ser Ile Leu Ser Pro Val Ile Lys Thr Tyr  
 195 200 205  
 Phe Ala Gln Gln Lys Asn Ile Asp Pro Lys Lys Ile Val Asn Val Cys  
 210 215 220  
 Val Thr Pro Cys Thr Ala Lys Lys Ala Glu Ile Arg Arg Pro Glu Leu  
 225 230 235 240  
 Ser Ala Ser Gly Leu Phe Trp Asp Glu Pro Glu Ile Arg Asp Thr Asp  
 245 250 255  
 Ile Cys Ile Thr Thr Arg Glu Leu Ala Gln Trp Ile Gln Asp Glu Asn  
 260 265 270  
 Ile Asp Phe Ala Ser Leu Glu Asp Ser Lys Phe Asp Lys Ala Phe Gly  
 275 280 285  
 Glu Ala Ser Gly Gly Gly Arg Ile Phe Gly Asn Ser Gly Gly Val Met  
 290 295 300  
 Glu Ala Ala Ile Arg Thr Ala Tyr His Met Phe Thr Gly Arg Pro Ala  
 305 310 315 320  
 Pro Lys Asp Phe Ile Pro Phe Glu Pro Val Arg Gly Leu Gln Gly Val  
 325 330 335  
 Lys Lys Ala Thr Val Ile Phe Gly His Phe Val Leu His Val Ala Ala  
 340 345 350  
 Ile Ser Gly Leu Gly Asn Ala Arg Ala Phe Ile Asp Asp Leu Ile Lys  
 355 360 365  
 Asn Asp Ala Phe Glu Asp Tyr Ser Phe Ile Glu Val Met Ala Cys Pro  
 370 375 380  
 Gly Gly Cys Ile Gly Gly Gly Gly Gln Pro Lys Val Lys Leu Pro Gln  
 385 390 395 400

Val Lys Lys Val Gln Glu Ala Arg Thr Ala Ser Ile Tyr Lys Ser Asp  
405 410 415

Glu Glu Thr Asp Ile Lys Ala Ser Trp Gln Asn Pro Glu Ile Glu Thr  
420 425 430

Leu Tyr Glu Ala Phe Leu Asp Glu Pro Leu Ser Glu Met Ala Glu Phe  
435 440 445

Thr Leu His Thr Tyr Phe Ser Asp Lys Ser Asp Gln Leu Gly Arg Met  
450 455 460

Lys Asn Leu Thr Pro Gln Thr Asn Pro Met Ser Pro Lys Tyr Lys Pro  
465 470 475 480

Pro Thr Glu Glu

<210> 13  
<211> 421  
<212> PRT  
<213> Desulfovibrio desulfuricans strain

<400> 13

Met Asn Leu Val Glu Met Glu Lys Ile Gln Tyr Val Asp Gln Ser Pro  
1 5 10 15

Asp Pro Arg Ala Asn Pro Asp Glu Leu Phe Phe Ile Gln Ile Asp Pro  
20 25 30

Glu Lys Cys Ile Gly Cys Asp Thr Cys Gln Glu Tyr Cys Pro Thr Gly  
35 40 45

Ala Ile Phe Gly Asp Thr Gly Ser Ala His Ser Ile Pro His Glu Glu  
50 55 60

Ile Cys Ile Asn Cys Gly Gln Cys Leu Thr His Cys Pro Val Gly Ala  
65 70 75 80

Ile Tyr Glu Val Gln Ser Trp Val Arg Glu Leu Ser Glu Lys Ile Lys  
85 90 95

Asp Pro Glu Ile Lys Val Ile Ala Met Pro Ala Pro Ala Val Arg Tyr  
100 105 110

Gly Leu Gly Glu Cys Phe Gly Met Pro Val Gly Thr Val Thr Thr Gly  
115 120 125

Lys Met Leu Thr Ala Leu Gln Met Leu Gly Phe Asp His Val Trp Asp  
130 135 140

Asn Glu Phe Thr Ala Asp Val Thr Ile Trp Glu Glu Gly Thr Glu Phe

145                      150                      155                      160  
 Val Asn Arg Leu Thr Gly Gln Ile Asp Lys Pro Leu Pro Gln Phe Thr  
                                  165                                   170                                   175  
 Ser Cys Cys Pro Gly Trp His Lys Tyr Val Glu Ser Phe Tyr Pro Glu  
                                  180                                   185                                   190  
 Leu Phe Pro His Leu Ser Ser Cys Lys Ser Pro Ile Gly Met Met Gly  
                                  195                                   200                                   205  
 Ala Leu Ala Lys Thr Tyr Gly Pro Asp Val Met Lys Tyr Asp Arg Ser  
                                  210                                   215                                   220  
 Lys Val Tyr Thr Val Ser Ile Met Pro Cys Thr Ala Lys Lys Tyr Glu  
                                  225                                   230                                   235                                   240  
 Gly Met Arg Ala Asp Leu Trp Ser Ser Gly Tyr Lys Asp Ile Asp Ala  
    245                                   250                                   255  
 Thr Ile Asp Thr Arg Glu Leu Ala Tyr Met Ile Lys Lys Ala Gly Ile  
                                  260                                   265                                   270  
 Asp Phe Ala Ala Leu Pro Asp Gly Lys Arg Asp Thr Leu Met Gly Asp  
                                  275                                   280                                   285  
 Ser Thr Gly Gly Ala Thr Ile Phe Gly Val Ser Gly Gly Val Met Glu  
                                  290                                   295                                   300  
 Ala Ala Leu Arg Tyr Ala Tyr Glu Ala Val Thr Gly Lys Lys Pro Ser  
                                  305                                   310                                   315                                   320  
 Ser Trp Asp Phe Thr Met Val Arg Gly Leu Asn Gly Ile Lys Glu Gly  
    325                                   330                                   335  
 Thr Val Thr Ile Gly Asp Ala Lys Ile Asn Val Ala Val Val His Gly  
                                  340                                   345                                   350  
 Ala Lys Arg Phe Ala Glu Val Cys Glu Val Ile Lys Thr Gly Lys Ser  
                                  355                                   360                                   365  
 Pro Trp His Phe Ile Glu Phe Met Ala Cys Pro Gly Gly Cys Val Cys  
                                  370                                   375                                   380  
 Gly Gly Gly Gln Pro Val Met Pro Gly Val Leu Glu Ala Met Asp Arg  
                                  385                                   390                                   395                                   400  
 Lys Val Ser Arg Thr Phe Ala Gly Leu Lys Glu Arg Leu Asn Arg Met  
    405                                   410                                   415  
 Ser Ser Ser Lys Ala  
    420

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<210> 14  
 <211> 585  
 <212> PRT  
 <213> Desulfovibrio fructosovorans

<400> 14

Met Ser Met Leu Thr Ile Thr Ile Asp Gly Lys Thr Thr Ser Val Pro  
 1 5 10 15

Glu Gly Ser Thr Ile Leu Asp Ala Ala Lys Thr Leu Asp Ile Asp Ile  
 20 25 30

Pro Thr Leu Cys Tyr Leu Asn Leu Glu Ala Leu Ser Ile Asn Asn Lys  
 35 40 45

Ala Ala Ser Cys Arg Val Cys Val Val Glu Val Glu Gly Arg Arg Asn  
 50 55 60

Leu Ala Pro Ser Cys Ala Thr Pro Val Thr Asp Asn Met Val Val Lys  
 65 70 75 80

Thr Asn Ser Leu Arg Val Leu Asn Ala Arg Arg Thr Val Leu Glu Leu  
 85 90 95

Leu Leu Ser Asp His Pro Lys Asp Cys Leu Val Cys Ala Lys Ser Gly  
 100 105 110

Glu Cys Glu Leu Gln Thr Leu Ala Glu Arg Phe Gly Ile Arg Glu Ser  
 115 120 125

Pro Tyr Asp Gly Gly Glu Met Ser His Tyr Arg Lys Asp Ile Ser Ala  
 130 135 140

Ser Ile Ile Arg Asp Met Asp Lys Cys Ile Met Cys Arg Arg Cys Glu  
 145 150 155 160

Thr Met Cys Asn Thr Val Gln Thr Cys Gly Val Leu Ser Gly Val Asn  
 165 170 175

Arg Gly Phe Thr Ala Val Val Ala Pro Ala Phe Glu Met Asn Leu Ala  
 180 185 190

Asp Thr Val Cys Thr Asn Cys Gly Gln Cys Val Ala Val Cys Pro Thr  
 195 200 205

Gly Ala Leu Val Glu His Glu Tyr Ile Trp Glu Val Val Glu Ala Leu  
 210 215 220

Ala Asn Pro Asp Lys Val Val Ile Val Gln Thr Ala Pro Ala Val Arg  
 225 230 235 240

Ala Ala Leu Gly Glu Asp Leu Gly Val Ala Pro Gly Thr Ser Val Thr  
 245 250 255

Gly Lys Met Ala Ala Ala Leu Arg Arg Leu Gly Phe Asp His Val Phe  
 260 265 270  
 Asp Thr Asp Phe Ala Ala Asp Leu Thr Ile Met Glu Glu Gly Ser Glu  
 275 280 285  
 Phe Leu Asp Arg Leu Gly Lys His Leu Ala Gly Asp Thr Asn Val Lys  
 290 295 300  
 Leu Pro Ile Leu Thr Ser Cys Cys Pro Gly Trp Val Lys Phe Phe Glu  
 305 310 315 320  
 His Gln Phe Pro Asp Met Leu Asp Val Pro Ser Thr Ala Lys Ser Pro  
 325 330 335  
 Gln Gln Met Phe Gly Ala Ile Ala Lys Thr Tyr Tyr Ala Asp Leu Leu  
 340 345 350  
 Gly Ile Pro Arg Glu Lys Leu Val Val Val Ser Val Met Pro Cys Leu  
 355 360 365  
 Ala Lys Lys Tyr Glu Cys Ala Arg Pro Glu Phe Ser Val Asn Gly Asn  
 370 375 380  
 Pro Asp Val Asp Ile Val Ile Thr Thr Arg Glu Leu Ala Lys Leu Val  
 385 390 395 400  
 Lys Arg Met Asn Ile Asp Phe Ala Gly Leu Pro Asp Glu Asp Phe Asp  
 405 410 415  
 Ala Pro Leu Gly Ala Ser Thr Gly Ala Ala Pro Ile Phe Gly Val Thr  
 420 425 430  
 Gly Gly Val Ile Glu Ala Ala Leu Arg Thr Ala Tyr Glu Leu Ala Thr  
 435 440 445  
 Gly Glu Thr Leu Lys Lys Val Asp Phe Glu Asp Val Arg Gly Met Asp  
 450 455 460  
 Gly Val Lys Lys Ala Lys Val Lys Val Gly Asp Asn Glu Leu Val Ile  
 465 470 475 480  
 Gly Val Ala His Gly Leu Gly Asn Ala Arg Glu Leu Leu Lys Pro Cys  
 485 490 495  
 Gly Ala Gly Glu Thr Phe His Ala Ile Glu Val Met Ala Cys Pro Gly  
 500 505 510  
 Gly Cys Ile Gly Gly Gly Gly Gln Pro Tyr His His Gly Asp Val Glu  
 515 520 525

Leu Leu Lys Lys Arg Thr Gln Val Leu Tyr Ala Glu Asp Ala Gly Lys  
 530 535 540

Pro Leu Arg Lys Ser His Glu Asn Pro Tyr Ile Ile Glu Leu Tyr Glu  
 545 550 555 560

Lys Phe Leu Gly Lys Pro Leu Ser Glu Arg Ser His Gln Leu Leu His  
 565 570 575

Thr His Tyr Phe Lys Arg Gln Arg Leu  
 580 585

<210> 15  
 <211> 421  
 <212> PRT  
 <213> Desulfovibrio fructosovorans

<400> 15

Met Ser Arg Ile Glu Met Ala Lys Ile Phe Tyr Glu Gln Thr Val Pro  
 1 5 10 15

Pro Pro Gly Thr Asn Leu Asp Gln Ala Tyr Ile Val Gln Val Asp Glu  
 20 25 30

Thr Lys Cys Ile Gly Cys Asp Thr Cys Met Gly Tyr Cys Pro Thr Gly  
 35 40 45

Ala Ile Thr Gly Glu Ser Gly Glu Pro His Lys Val Val Asp Pro Ala  
 50 55 60

Ala Cys Ile Asn Cys Gly Gln Cys Leu Thr His Cys Pro Val Ala Ala  
 65 70 75 80

Ile Tyr Glu Thr Val Ser Phe Val Pro Glu Ile Glu Ala Lys Leu Lys  
 85 90 95

Asp Lys Asn Val Lys Val Ile Ala Met Pro Ala Pro Ala Val Arg Tyr  
 100 105 110

Ala Leu Gly Asp Pro Phe Gly Met Pro Leu Gly Ala Val Thr Thr Glu  
 115 120 125

His Met Leu Thr Gly Leu Lys Gln Leu Gly Phe Asp Asn Val Trp Asp  
 130 135 140

Asn Glu Phe Thr Ala Asp Val Thr Ile Trp Glu Glu Gly Ser Glu Leu  
 145 150 155 160

Leu Ala Arg Ile Thr Lys Lys Leu Asp Lys Pro Leu Pro Gln Phe Thr  
 165 170 175

Ser Cys Cys Pro Gly Trp Gln Lys Tyr Ala Glu Thr Phe Tyr Pro Glu  
 180 185 190

061010 third listing.txt

Leu Leu Pro His Phe Ser Ser Cys Lys Ser Pro Ile Gly Met Met Gly  
195 200 205

Pro Leu Ala Lys Thr Tyr Gly Ala Lys Glu Leu Gly Tyr Glu Pro Lys  
210 215 220

Gln Ile Tyr Thr Val Ser Ile Met Pro Cys Thr Ala Lys Lys Phe Glu  
225 230 235 240

Gly Met Arg Pro Glu Met Asp Ala Ser Gly Phe Arg Asp Ile Asp Ala  
245 250 255

Thr Ile Asn Thr Arg Glu Leu Ala Tyr Met Met Lys Lys Ala Gly Ile  
260 265 270

Asp Leu Pro Lys Ile Ala Asn Gly Lys Arg Asp Ala Val Met Gly Glu  
275 280 285

Ser Thr Gly Gly Ala Thr Ile Phe Gly Val Ser Gly Gly Val Met Glu  
290 295 300

Ala Ala Leu Arg Phe Ala Tyr Gln Ala Leu Thr Lys Lys Pro Pro Gln  
305 310 315 320

Ser Trp Asp Phe Lys Ala Val Arg Gly Leu Asn Gly Ile Lys Glu Ala  
325 330 335

Thr Ile Asn Ile Gly Gly Thr Asp Val Lys Val Ala Val Val Asn Gly  
340 345 350

Gly Lys Asn Phe Ala Lys Val Cys Asp Glu Val Lys Ala Gly Lys Ser  
355 360 365

Pro Tyr His Phe Ile Glu Phe Met Ala Cys Pro Gly Gly Cys Val Met  
370 375 380

Gly Gly Gly Gln Pro Ile Met Pro Thr Val Leu Glu Ser Met Asn Arg  
385 390 395 400

Thr Thr Thr Lys Phe Tyr Ala Ser Leu Lys Lys Arg Leu Ala Leu Tyr  
405 410 415

Asp Ala Gln Lys Ala  
420

<210> 16  
<211> 608  
<212> PRT  
<213> Thermotoga maritima

<400> 16

Met Arg Arg Phe Phe Lys Asn Asn Leu Arg Asn Leu Ser Gln Asn Gly  
1 5 10 15



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Glu Thr Asn Ser Val Arg Arg Cys Phe Ala Leu Ala Asp Val Thr Val  
 20 25 30  
 Val Ile Asn Gly Arg Thr Leu Thr Val Pro Asp Asn Leu Thr Val Ile  
 35 40 45  
 Glu Ala Cys Glu Lys Ala Gly Ile Glu Ile Pro Ala Leu Cys His His  
 50 55 60  
 Pro Arg Leu Gly Glu Ser Ile Gly Ala Cys Arg Val Cys Val Val Glu  
 65 70 75 80  
 Val Glu Gly Ala Arg Asn Leu Gln Pro Ala Cys Val Thr Lys Val Arg  
 85 90 95  
 Asp Gly Met Val Ile Lys Thr Ser Ser Asp Arg Val Lys Thr Ala Arg  
 100 105 110  
 Lys Phe Asn Leu Ala Leu Leu Leu Ser Glu His Pro Asn Asp Cys Met  
 115 120 125  
 Thr Cys Glu Ala Asn Gly Arg Cys Glu Phe Gln Asp Leu Ile Tyr Lys  
 130 135 140  
 Tyr Asp Val Glu Pro Ile Phe Gly Tyr Gly Thr Lys Glu Gly Leu Val  
 145 150 155 160  
 Asp Arg Ser Ser Pro Ala Ile Val Arg Asp Leu Ser Lys Cys Ile Lys  
 165 170 175  
 Cys Gln Arg Cys Val Arg Ala Cys Ser Glu Leu Gln Gly Met His Ile  
 180 185 190  
 Tyr Ser Met Val Glu Arg Gly His Arg Thr Tyr Pro Gly Thr Pro Phe  
 195 200 205  
 Asp Met Pro Val Tyr Glu Thr Asp Cys Ile Gly Cys Gly Gln Cys Ala  
 210 215 220  
 Ala Phe Cys Pro Thr Gly Ala Ile Val Glu Asn Ser Ala Val Lys Val  
 225 230 235 240  
 Val Leu Glu Glu Leu Glu Lys Lys Glu Lys Ile Leu Val Val Gln Thr  
 245 250 255  
 Ala Pro Ser Val Arg Val Ala Ile Gly Glu Glu Phe Gly Tyr Ala Pro  
 260 265 270  
 Gly Thr Ile Ser Thr Gly Gln Met Val Ala Ala Leu Arg Arg Leu Gly  
 275 280 285

Phe Asp Tyr Val Phe Asp Thr Asn Phe Gly Ala Asp Leu Thr Ile Met  
 290 295 300  
 Glu Glu Gly Ser Glu Phe Leu Glu Arg Leu Glu Lys Gly Asp Leu Glu  
 305 310 315 320  
 Asp Leu Pro Met Phe Thr Ser Cys Cys Pro Gly Trp Val Asn Leu Val  
 325 330 335  
 Glu Lys Val Tyr Pro Glu Leu Arg Thr Arg Leu Ser Ser Ala Lys Ser  
 340 345 350  
 Pro Gln Gly Met Leu Ser Ala Met Val Lys Thr Tyr Phe Ala Glu Lys  
 355 360 365  
 Leu Gly Val Lys Pro Glu Asp Ile Phe His Val Ser Ile Met Pro Cys  
 370 375 380  
 Thr Ala Lys Lys Asp Glu Ala Leu Arg Lys Gln Leu Met Val Asn Gly  
 385 390 395 400  
 Val Pro Ala Val Asp Val Val Leu Thr Thr Arg Glu Leu Gly Lys Leu  
 405 410 415  
 Ile Arg Met Lys Lys Ile Pro Phe Ala Asn Leu Pro Glu Glu Glu Tyr  
 420 425 430  
 Asp Ala Pro Leu Gly Ile Ser Thr Gly Ala Ala Ala Leu Phe Gly Val  
 435 440 445  
 Thr Gly Gly Val Met Glu Ala Ala Leu Arg Thr Ala Tyr Glu Leu Lys  
 450 455 460  
 Thr Gly Lys Ala Leu Pro Lys Ile Val Phe Glu Glu Val Arg Gly Leu  
 465 470 475 480  
 Lys Gly Val Arg Glu Ala Glu Ile Asp Leu Asp Gly Lys Lys Ile Arg  
 485 490 495  
 Ile Ala Val Val His Gly Thr Ala Asn Val Arg Asn Leu Val Glu Lys  
 500 505 510  
 Ile Leu Arg Arg Glu Val Lys Tyr His Phe Val Glu Val Met Ala Cys  
 515 520 525  
 Pro Gly Gly Cys Ile Gly Gly Gly Gly Gln Pro Tyr Ser Arg Asp Pro  
 530 535 540  
 Glu Ile Leu Arg Lys Arg Ala Glu Ala Ile Tyr Thr Ile Asp Glu Arg  
 545 550 555 560  
 Met Thr Leu Arg Lys Ser His Glu Asn Pro Ala Ile Lys Lys Leu Tyr  
 565 570 575

061010 third listing.txt

Glu Glu Tyr Leu Glu His Pro Leu Ser His Lys Ala His Glu Leu Leu  
580 585 590

His Thr Tyr Tyr Glu Asp Arg Ser Arg Lys Lys Arg Leu Ala Val Lys  
595 600 605

<210> 17  
<211> 645  
<212> PRT  
<213> Thermotoga maritima

<400> 17

Met Lys Ile Tyr Val Asp Gly Arg Glu Val Ile Ile Asn Asp Asn Glu  
1 5 10 15

Arg Asn Leu Leu Glu Ala Leu Lys Asn Val Gly Ile Glu Ile Pro Asn  
20 25 30

Leu Cys Tyr Leu Ser Glu Ala Ser Ile Tyr Gly Ala Cys Arg Met Cys  
35 40 45

Leu Val Glu Ile Asn Gly Gln Ile Thr Thr Ser Cys Thr Leu Lys Pro  
50 55 60

Tyr Glu Gly Met Lys Val Lys Thr Asn Thr Pro Glu Ile Tyr Glu Met  
65 70 75 80

Arg Arg Asn Ile Leu Glu Leu Ile Leu Ala Thr His Asn Arg Asp Cys  
85 90 95

Thr Thr Cys Asp Arg Asn Gly Ser Cys Lys Leu Gln Lys Tyr Ala Glu  
100 105 110

Asp Phe Gly Ile Arg Lys Ile Arg Phe Glu Ala Leu Lys Lys Glu His  
115 120 125

Val Arg Asp Glu Ser Ala Pro Val Val Arg Asp Thr Ser Lys Cys Ile  
130 135 140

Leu Cys Gly Asp Cys Val Arg Val Cys Glu Glu Ile Gln Gly Val Gly  
145 150 155 160

Val Ile Glu Phe Ala Lys Arg Gly Phe Glu Ser Val Val Thr Thr Ala  
165 170 175

Phe Asp Thr Pro Leu Ile Glu Thr Glu Cys Val Leu Cys Gly Gln Cys  
180 185 190

Val Ala Tyr Cys Pro Thr Gly Ala Leu Ser Ile Arg Asn Asp Ile Asp  
195 200 205

Lys Leu Ile Glu Ala Leu Glu Ser Asp Lys Ile Val Ile Gly Met Ile

210

215

220

Ala Pro Ala Val Arg Ala Ala Ile Gln Glu Glu Phe Gly Ile Asp Glu  
225 230 235 240

Asp Val Ala Met Ala Glu Lys Leu Val Ser Phe Leu Lys Thr Ile Gly  
245 250 255

Phe Asp Lys Val Phe Asp Val Ser Phe Gly Ala Asp Leu Val Ala Tyr  
260 265 270

Glu Glu Ala His Glu Phe Tyr Glu Arg Leu Lys Lys Gly Glu Arg Leu  
275 280 285

Pro Gln Phe Thr Ser Cys Cys Pro Ala Trp Val Lys His Ala Glu His  
290 295 300

Thr Tyr Pro Gln Tyr Leu Gln Asn Leu Ser Ser Val Lys Ser Pro Gln  
305 310 315 320

Gln Ala Leu Gly Thr Val Ile Lys Lys Ile Tyr Ala Arg Lys Leu Gly  
325 330 335

Val Pro Glu Glu Lys Ile Phe Leu Val Ser Phe Met Pro Cys Thr Ala  
340 345 350

Lys Lys Phe Glu Ala Glu Arg Glu Glu His Glu Gly Ile Val Asp Ile  
355 360 365

Val Leu Thr Thr Arg Glu Leu Ala Gln Leu Ile Lys Met Ser Arg Ile  
370 375 380

Asp Ile Asn Arg Val Glu Pro Gln Pro Phe Asp Arg Pro Tyr Gly Val  
385 390 395 400

Ser Ser Gln Ala Gly Leu Gly Phe Gly Lys Ala Gly Gly Val Phe Ser  
405 410 415

Cys Val Leu Ser Val Leu Asn Glu Glu Ile Gly Ile Glu Lys Val Asp  
420 425 430

Val Lys Ser Pro Glu Asp Gly Ile Arg Val Ala Glu Val Thr Leu Lys  
435 440 445

Asp Gly Thr Ser Phe Lys Gly Ala Val Ile Tyr Gly Leu Gly Lys Val  
450 455 460

Lys Lys Phe Leu Glu Glu Arg Lys Asp Val Glu Ile Ile Glu Val Met  
465 470 475 480

Ala Cys Asn Tyr Gly Cys Val Gly Gly Gly Gly Gln Pro Tyr Pro Asn  
485 490 495

061010 third listing.txt

Asp Ser Arg Ile Arg Glu His Arg Ala Lys Val Leu Arg Asp Thr Met  
 500 505 510  
 Gly Ile Lys Ser Leu Leu Thr Pro Val Glu Asn Leu Phe Leu Met Lys  
 515 520 525  
 Leu Tyr Glu Glu Asp Leu Lys Asp Glu His Thr Arg His Glu Ile Leu  
 530 535 540  
 His Thr Thr Tyr Arg Pro Arg Arg Arg Tyr Pro Glu Lys Asp Val Glu  
 545 550 555 560  
 Ile Leu Pro Val Pro Asn Gly Glu Lys Arg Thr Val Lys Val Cys Leu  
 565 570 575  
 Gly Thr Ser Cys Tyr Thr Lys Gly Ser Tyr Glu Ile Leu Lys Lys Leu  
 580 585 590  
 Val Asp Tyr Val Lys Glu Asn Asp Met Glu Gly Lys Ile Glu Val Leu  
 595 600 605  
 Gly Thr Phe Cys Val Glu Asn Cys Gly Ala Ser Pro Asn Val Ile Val  
 610 615 620  
 Asp Asp Lys Ile Ile Gly Gly Ala Thr Phe Glu Lys Val Leu Glu Glu  
 625 630 635 640  
 Leu Ser Lys Asn Gly  
 645  
 <210> 18  
 <211> 1206  
 <212> PRT  
 <213> Nyctotherus ovalis  
 <400> 18  
 Met Ile Ser Arg Leu Ile Ala Lys Lys Ala Pro Leu Phe Leu Arg Thr  
 1 5 10 15  
 Phe Ala Thr Ser Glu Met Ile Ser Leu Lys Ile Asp Gly Lys Ile Ile  
 20 25 30  
 Ser Val Pro Lys Gly Ile Met Leu Ala Asp Ala Ile Lys Lys Ala Gly  
 35 40 45  
 Ala Asn Val Pro Thr Met Cys Tyr His Pro Asp Leu Pro Thr Ser Gly  
 50 55 60  
 Gly Ile Cys Arg Val Cys Leu Val Glu Ser Ala Lys Ser Pro Gly Tyr  
 65 70 75 80  
 Pro Ile Ile Ser Cys Arg Thr Pro Val Glu Glu Gly Met Glu Ile Val  
 85 90 95

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Thr Gln Gly Ser Lys Met Lys Glu Tyr Arg Gln Ala Asn Leu Ala Leu  
 100 105 110  
 Met Leu Ser Arg His Pro Asn Ala Cys Leu Ser Cys Thr Ser Asn Thr  
 115 120 125  
 Asn Cys Lys Thr Gln Glu Leu Ser Ala Asn Met Asn Ile Gly Gln Cys  
 130 135 140  
 Gly Phe Ala Asn Ala Thr Pro Pro Lys Asn Asp Asp Ser Tyr Asp Met  
 145 150 155 160  
 Thr Thr Ala Ile Glu Arg Asp Asn Asp Lys Cys Ile Asn Cys Asp Ile  
 165 170 175  
 Cys Val His Thr Cys Ser Leu Gln Gly Leu Asn Ala Leu Gly Phe Tyr  
 180 185 190  
 Asn Glu Glu Gly His Ala Val Lys Ser Met Gly Thr Leu Asp Val Ser  
 195 200 205  
 Glu Cys Ile Gln Cys Gly Gln Cys Ile Asn Arg Cys Pro Thr Gly Ala  
 210 215 220  
 Ile Thr Glu Lys Ser Glu Ile Arg Pro Val Leu Asp Ala Ile Asn Ile  
 225 230 235 240  
 Gln Gln Arg Leu Val Phe Gln Met Ala Pro Ser Ile Arg Val Ala Val  
 245 250 255  
 Ala Glu Glu Phe Gly Ile Lys Pro Gly Glu Lys Ile Leu Lys Asn Glu  
 260 265 270  
 Ile Ala Thr Ala Leu Arg Lys Leu Gly Ser Asn Val Phe Val Leu Asp  
 275 280 285  
 Thr Asn Phe Ser Ala Asp Leu Thr Ile Ile Glu Glu Gly His Glu Leu  
 290 295 300  
 Ile Glu Arg Leu Tyr Arg Asn Val Thr Gly Lys Lys Leu Leu Gly Gly  
 305 310 315 320  
 Asp His Met Pro Ile Asp Leu Pro Met Leu Thr Ser Cys Cys Pro Gly  
 325 330 335  
 Trp Ile Met Phe Ile Glu Lys Asn Tyr Pro Asp Leu Leu Asn Asn Leu  
 340 345 350  
 Ser Thr Cys Lys Ser Pro Gln Gly Met Leu Gly Ala Leu Ile Lys Gly  
 355 360 365

Tyr Trp Ala Lys Asn Ile Lys Lys Met Asp Pro Lys Asp Ile Val Ser  
 370 375 380  
 Val Ser Ile Met Pro Cys Thr Ala Lys Lys Ala Glu Lys Glu Arg Pro  
 385 390 395 400  
 Gln Leu Arg Gly Asp Glu Gly Tyr Lys Asp Val Asp Tyr Ile Leu Thr  
 405 410 415  
 Thr Arg Glu Leu Ala Lys Met Leu Lys Gln Ser Asn Ile Asp Leu Ala  
 420 425 430  
 Lys Met Glu Pro Thr Pro Phe Asp Lys Val Met Ser Glu Gly Thr Gly  
 435 440 445  
 Ala Ala Val Ile Phe Gly Val Thr Gly Gly Val Met Glu Ala Ala Leu  
 450 455 460  
 Arg Thr Ala Asn Glu Val Ile Thr Gly Arg Glu Val Pro Phe Lys Asn  
 465 470 475 480  
 Leu Asn Ile Glu Ala Val Arg Gly Met Glu Gly Ile Arg Glu Ala Gly  
 485 490 495  
 Ile Lys Leu Glu Asn Val Leu Asp Lys Tyr Lys Ala Phe Glu Gly Val  
 500 505 510  
 Thr Val Lys Val Ala Ile Ala His Gly Pro Asn Asn Ala Arg Lys Val  
 515 520 525  
 Met Asp Ile Ile Lys Gln Ala Lys Glu Ser Gly Lys Pro Ala Pro Trp  
 530 535 540  
 His Phe Val Glu Val Met Ala Cys Pro Gly Gly Cys Ile Gly Gly Gly  
 545 550 555 560  
 Gly Gln Pro Lys Pro Thr Asn Leu Glu Ile Arg Gln Ala Arg Thr Gln  
 565 570 575  
 Leu Thr Phe Lys Glu Asp Met Asp Leu Pro Leu Arg Lys Ser His Asp  
 580 585 590  
 Asn Pro Glu Ile Lys Ala Ile Tyr Glu Asn Tyr Leu Lys Glu Pro Leu  
 595 600 605  
 Gly His Asn Ser His His Tyr Leu His Thr Thr Tyr Ser Ser Gln Lys  
 610 615 620  
 Val Arg Asp Met Asn Leu Tyr Asn Ala Asn Glu Ala Ala Gly Leu Asp  
 625 630 635 640  
 Glu Ile Leu Ala Lys Tyr Pro Lys Glu Lys Glu Tyr Leu Met Pro Ile  
 645 650 655

Ile Ile Glu Glu His Asp Lys Lys Gly Tyr Ile Ser Asp Pro Ser Ile  
 660 665 670  
 Val Lys Ile Ser Glu His Leu Gly Met Tyr Pro Ala Gln Ile Glu Ser  
 675 680 685  
 Ile Leu Ser Ser Tyr His Tyr Phe Pro Arg Glu His Thr Ile Ala Ile  
 690 695 700  
 Leu Met Ser Ile Cys Val His Cys His Asn Cys Met Met Lys Gly Gln  
 705 710 715 720  
 Gly Arg Leu Leu Lys Thr Ile Gln Glu Thr Tyr Asp Ile His Glu Thr  
 725 730 735  
 His Gly Gly Val Ala Lys Asp Gly Ser Phe Thr Leu His Thr Leu Asn  
 740 745 750  
 Trp Leu Gly Tyr Cys Val Asn Asp Ala Pro Ala Met Met Ile Lys Arg  
 755 760 765  
 Lys Gly Thr Asn Tyr Val Glu Thr Phe Thr Gly Leu Leu Gly Asp Asn  
 770 775 780  
 Ile Asp Gln Arg Leu Lys Ser Leu Lys Asn Leu Lys Lys Glu Leu Pro  
 785 790 795 800  
 Lys Trp Pro Lys Asn Asn Ile Arg Glu Met Lys Ser Gln Arg Asn Gly  
 805 810 815  
 Asn Ser Tyr Ser Cys Met Asn Thr Gln Ala Pro Ile Ala Glu Ala Thr  
 820 825 830  
 Lys Lys Ala Val Ser Met Gly Pro Glu Lys Val Ile Glu Glu Val Phe  
 835 840 845  
 Lys Ser Asn Leu Val Gly Arg Gly Gly Ala Gly Phe Arg Thr Gly Lys  
 850 855 860  
 Lys Trp Glu Ser Ala Tyr Lys Thr Pro Ala Ser Asp Lys Tyr Val Val  
 865 870 875 880  
 Cys Asn Ala Asp Glu Gly Leu Pro Ser Thr Tyr Lys Asp Trp Cys Leu  
 885 890 895  
 Leu Asn Asn Glu Ala Lys Arg Lys Glu Val Phe Thr Gly Met Gly Ile  
 900 905 910  
 Cys Ala Lys Thr Ile Gly Ala Lys Arg Cys Phe Met Tyr Leu Arg Tyr  
 915 920 925



Glu Tyr Arg Asn Leu Val Pro Ala Leu Glu Gln Ser Ile Lys Asp Val  
 930 935 940

Gln Ser Thr Cys Pro Glu Leu Ala Asp Leu Lys Tyr Glu Ile Arg Leu  
 945 950 955 960

Gly Gly Gly Pro Tyr Val Ala Gly Glu Glu Asn Ala Gln Phe Glu Ser  
 965 970 975

Ile Glu Gly Arg Ala Pro Leu Pro Arg Lys Asp Arg Pro Gly Asn Ile  
 980 985 990

Phe Pro Thr Met Glu Gly Leu Phe His Lys Pro Thr Val Ile Asn Asn  
 995 1000 1005

Val Glu Thr Phe Phe Ala Ile Pro His Ile Ile Gln Gln Gly Ser  
 1010 1015 1020

Gln Ser Phe Gly Glu Gly Lys Met Pro Lys Leu Leu Ser Val Thr  
 1025 1030 1035

Gly Asp Val Asp Glu Pro Ile Leu Ile Glu Thr Asn Leu Asn Asn  
 1040 1045 1050

Tyr Ser Leu Asn His Leu Leu Gln Glu Ile Ser Ala Lys Asp Ile  
 1055 1060 1065

Val Ala Ala Glu Ile Gly Gly Cys Thr Glu Pro Ile Ile Phe Gly  
 1070 1075 1080

Ser Lys Phe Asp Thr Leu Phe Gly Phe Gly Arg Gly Thr Leu Asn  
 1085 1090 1095

Ala Val Gly Ser Val Val Leu Phe Asn Ser Ser Cys Asp Leu Gly  
 1100 1105 1110

Lys Ile Tyr Glu Asn Lys Leu Lys Phe Met Ala Glu Glu Ser Cys  
 1115 1120 1125

Lys Gln Cys Val Pro Cys Arg Asp Gly Ser Tyr Ile Phe His Arg  
 1130 1135 1140

Ala Phe Lys Glu Leu Arg Asp Thr Gly Lys Ser Ser Tyr Asn Met  
 1145 1150 1155

Arg Ala Leu Ala Val Ala Ser Glu Ser Ala Ala Arg Ser Ser Ile  
 1160 1165 1170

Cys Ala His Gly Lys Ala Leu Glu Ser Leu Phe Lys Ser Ala Cys  
 1175 1180 1185

Asp Phe Met Asn Lys Thr Lys Pro Ile Tyr Gln Pro His Ser Thr  
 1190 1195 1200

Tyr His Gln  
1205

<210> 19  
<211> 467  
<212> PRT  
<213> Spironucleus barkhanus

<400> 19

Met Lys Val Arg Gln Ser Pro Phe Lys Ile Asp Ile Thr Asn Gly Pro  
1 5 10 15

Ile Asp Arg Asn Asp Ala Ile Gln Ile Asp Tyr Gln Lys Cys Ile Gly  
20 25 30

Cys Gln Met Cys Ala Lys Thr Cys Thr Asp Ser Gln Asn Phe Asn Ile  
35 40 45

Phe Lys Ile Ser Ala Pro Lys Thr Lys Pro Phe Val Asn Ala Tyr Gly  
50 55 60

Ser Val Ala Glu Gly Thr Glu Arg Asn Ala Leu Ala Gly Thr Asp Cys  
65 70 75 80

Thr Gly Cys Gly Ala Cys Val Arg Ala Cys Pro Val Glu Ala Leu Met  
85 90 95

Pro Ala Phe Asn Ile Arg Pro Val Leu Glu Pro Ile Ser Glu Lys Lys  
100 105 110

Lys Val Thr Ile Ala Val Ile Ala Pro Ser Thr Arg Val Gly Leu Ala  
115 120 125

Glu Gly Met Gly Met Gly Val Gly Val Thr Ala Glu Arg Gln Met Val  
130 135 140

Tyr Glu Leu Lys Gln Met Gly Phe Asp Tyr Val Phe Asp Asn Met Trp  
145 150 155 160

Gly Ala Asp Ala Pro Thr Thr Glu Asp Ala Lys Glu Ile Leu Lys Ala  
165 170 175

Lys Ala Ala Gly Lys Thr Ala Phe Thr Ser Cys Cys Pro Ala Trp Val  
180 185 190

Lys Leu Val Glu Thr Thr Tyr Pro Glu Leu Leu Pro Asn Ile Ser Ser  
195 200 205

Ala Arg Ser Pro His Gly Ile Ile Cys Ser Val Ile Lys Lys Tyr Phe  
210 215 220

Ala Lys Asp Ile Gly Lys Lys Ala Asp Glu Leu Tyr Val Val Gly Val

225                      230                      235                      240  
 Met Pro Cys Thr Ala Lys Lys Asn Glu Ala Ala Arg Lys Glu Leu Thr  
                                  245                                   250                                   255  
 Thr Asp Gly Ser Pro Asp Cys Asp Ile Ser Ile Thr Thr Arg Glu Leu  
                                  260                                   265                                   270  
 Met Ala Tyr Leu Lys Glu Lys Lys Val Thr Phe Ser Ala Ala Arg Glu  
                                  275                                   280                                   285  
 Ile Glu Leu Lys Asp Asn Val Gln Ala Gln Tyr Asp Ala Pro Phe Asn  
                                  290                                   295                                   300  
 Thr Phe Ser Gly Ser Ala Tyr Ile Tyr Gly Lys Thr Ala Gly Val Thr  
                                  305                                   310                                   315                                   320  
 Glu Ala Val Val Arg Tyr Val Cys Ala Ile Lys Lys Val Pro Phe Ser  
                                  325                                   330                                   335  
 Val Gly Met Ile Thr Lys Glu Leu Ile Trp Glu Asn Lys Leu His Ser  
                                  340                                   345                                   350  
 Ser Ser Leu Thr Leu Leu Thr Phe Ser Ala Ala Gly Glu Asp Tyr Arg  
                                  355                                   360                                   365  
 Ile Cys Val Ser Tyr Gly Gly Leu Ala Ala His Lys Ala Val Glu Leu  
                                  370                                   375                                   380  
 Tyr Lys Ser Gly Glu Leu Lys Val Asp Ala Val Glu Val Met Val Cys  
                                  385                                   390                                   395                                   400  
 Pro Gly Gly Cys Val Gly Gly Gly Gly Gln Pro Lys Gln Pro Lys Lys  
                                  405                                   410                                   415  
 Asp Met Ile Leu Lys Arg His Glu Gly Leu Asp Lys His Asp Lys Glu  
                                  420                                   425                                   430  
 Ala Pro Tyr Ser Asn Cys Thr Glu Asn Pro Thr Leu Asn Glu Phe Tyr  
                                  435                                   440                                   445  
 Glu Arg Ile Gly Thr Asp Val His His Val Met His Thr Thr Tyr Ser  
                                  450                                   455                                   460

Ala Tyr Lys  
465

<210> 20  
 <211> 468  
 <212> PRT  
 <213> Trichomonas vaginalis  
 <400> 20

Met Leu Ala Ser Ser Ala Thr Ala Met Lys Gly Phe Ala Asn Ser Leu  
 1 5 10 15  
 Arg Met Lys Asp Tyr Ser Ser Thr Gly Ile Asn Phe Asp Met Thr Lys  
 20 25 30  
 Cys Ile Asn Cys Gln Ser Cys Val Arg Ala Cys Thr Asn Ile Ala Gly  
 35 40 45  
 Gln Asn Val Leu Lys Ser Leu Thr Val Asn Gly Lys Ser Val Val Gln  
 50 55 60  
 Thr Val Thr Gly Lys Pro Leu Ala Glu Thr Asn Cys Ile Ser Cys Gly  
 65 70 75 80  
 Gln Cys Thr Leu Gly Cys Pro Lys Phe Thr Ile Phe Glu Ala Asp Ala  
 85 90 95  
 Ile Asn Pro Val Lys Glu Val Leu Thr Lys Lys Asn Gly Arg Ile Ala  
 100 105 110  
 Val Cys Gln Ile Ala Pro Ala Ile Arg Ile Asn Met Ala Glu Ala Leu  
 115 120 125  
 Gly Val Pro Ala Gly Thr Ile Ser Leu Gly Lys Val Val Thr Ala Leu  
 130 135 140  
 Lys Arg Leu Gly Phe Asp Tyr Val Phe Asp Thr Asn Phe Ala Ala Asp  
 145 150 155 160  
 Met Thr Ile Val Glu Glu Ala Thr Glu Leu Val Gln Arg Leu Ser Asp  
 165 170 175  
 Lys Asn Ala Val Leu Pro Met Phe Thr Ser Cys Cys Pro Ala Trp Val  
 180 185 190  
 Asn Tyr Val Glu Lys Ser Asp Pro Ser Leu Ile Pro Tyr Leu Ser Ser  
 195 200 205  
 Cys Arg Ser Pro Met Ser Met Leu Ser Ser Val Ile Lys Asn Val Phe  
 210 215 220  
 Pro Lys Lys Ile Gly Thr Thr Ala Asp Lys Ile Tyr Asn Val Ala Ile  
 225 230 235 240  
 Met Pro Cys Thr Arg Lys Lys Asp Glu Ile Gln Arg Ser Gln Phe Thr  
 245 250 255  
 Met Lys Asp Gly Lys Gln Glu Thr Gly Ala Val Leu Thr Ser Arg Glu  
 260 265 270  
 Leu Ala Lys Met Ile Lys Glu Ala Lys Ile Asn Phe Lys Glu Leu Pro  
 275 280 285

Asp Thr Pro Cys Asp Asn Phe Tyr Ser Glu Ala Ser Gly Gly Gly Ala  
290 295 300

Ile Phe Cys Ala Thr Gly Gly Val Met Glu Ala Ala Val Arg Ser Ala  
305 310 315 320

Tyr Lys Phe Leu Thr Lys Lys Glu Leu Ala Pro Ile Asp Leu Gln Asp  
325 330 335

Val Arg Gly Val Ala Ser Gly Val Lys Leu Ala Glu Val Asp Ile Ala  
340 345 350

Gly Thr Lys Val Lys Val Ala Val Ala His Gly Ile Lys Asn Ala Met  
355 360 365

Thr Leu Ile Lys Lys Ile Lys Ser Gly Glu Glu Gln Phe Lys Asp Val  
370 375 380

Lys Phe Val Glu Val Met Ala Cys Pro Gly Gly Cys Val Val Gly Gly  
385 390 395 400

Gly Ser Pro Lys Ala Lys Thr Lys Lys Ala Val Gln Ala Arg Leu Asn  
405 410 415

Ala Thr Tyr Ser Ile Asp Lys Ser Ser Lys His Arg Thr Ser Gln Asp  
420 425 430

Asn Pro Gln Leu Leu Gln Leu Tyr Lys Glu Ser Phe Glu Gly Lys Phe  
435 440 445

Gly Gly His Val Ala His His Leu Leu His Thr His Tyr Lys Asn Arg  
450 455 460

Lys Val Asn Pro  
465

<210> 21  
<211> 449  
<212> PRT  
<213> Trichomonas vaginalis

<400> 21

Met Leu Ala Ser Ser Ser Arg Ala Ala Ala Asn Ile Arg Trp Val Asp  
1 5 10 15

Thr Ser His Asn Ala Ile Ala Phe Asp Met His Lys Cys Ile Asn Cys  
20 25 30

Gln Ala Cys Val Arg Ala Cys Lys Asn Val Ala Gly Gln Ser Val Leu  
35 40 45

Lys Ser Val Lys Ile Asn Glu Gly Lys Lys Lys Gly Val Val Gln Thr

50

55

Val Thr Gly Lys Leu Leu Ala Glu Thr Asn Cys Ile Gly Cys Gly Gln  
65 70 75 80

Cys Thr Leu Val Cys Pro Thr Gln Ala Ile His Glu Lys Asp Ala Leu  
85 90 95

Lys Gln Met Asn Asn Ile Phe Lys Asn Lys Gly Asp Arg Ile Leu Val  
100 105 110

Cys Gln Ile Ala Pro Ala Ile Arg Ile Asn Met Arg Arg Pro Trp Cys  
115 120 125

Ser Ser Arg Asn Ser Phe His Arg Gln Ser Arg Tyr Ser Pro Gln Arg  
130 135 140

Leu Gly Phe Asp Tyr Val Phe Asp Thr Asn Phe Gly Ala Asp Leu Thr  
145 150 155 160

Ile Val Glu Glu Ala Thr Glu Leu Leu Gln Arg Leu Asn Asp Pro Lys  
165 170 175

Ala Val Leu Pro Met Phe Thr Ser Cys Cys Pro Ala Trp Val Asn Tyr  
180 185 190

Val Glu Lys Ser Tyr Pro Gln Trp Met Pro His Leu Ser Thr Cys Arg  
195 200 205

Ser Pro Ile Gly Met Leu Ser Ala Val Ile Lys Asn Val Phe Pro Lys  
210 215 220

His Ile Gly Val Asp Pro Lys Arg Ile Phe Ser Val Gly Ile Met Pro  
225 230 235 240

Cys Thr Ala Lys Lys Asp Glu Ala Ala Arg Glu Gln Leu Met Thr Lys  
245 250 255

Ser Gly Leu His Glu Thr Asp Leu Asp Ile Thr Ser Arg Glu Leu Ala  
260 265 270

Lys Met Ile Lys Ala Ala Lys Ile Asn Phe Lys Glu Leu Pro Asp Thr  
275 280 285

Glu Leu Asp Ser Pro Tyr Ala Met Ala Thr Gly Gly Gly Ala Ile Phe  
290 295 300

Cys Ala Thr Gly Gly Val Met Glu Ala Ala Val Arg Ser Ala Tyr Lys  
305 310 315 320

Phe Ala Thr Gly Lys Glu Leu Ala Pro Ile Glu Phe Val Gln Val Arg  
325 330 335

Gly Ala Glu Lys Gly Ile Lys Val Gly Thr Val Asp Ile Asn Gly Arg  
 340 345 350  
 Glu Ile Lys Val Ala Val Ala Gln Gly Val Lys Asn Ala Met Ser Leu  
 355 360 365  
 Ile Lys Lys Ile Glu Glu Gly Gln Asp Asp Val Lys Gly Val Val Phe  
 370 375 380  
 Cys Glu Val Met Ala Cys Pro Gly Gly Cys Val Gly Gly Gly Gly Ser  
 385 390 395 400  
 Pro Arg Ala Lys Thr Lys Ala Ala Met Asn Lys Arg Leu Asp Ala Thr  
 405 410 415  
 Tyr Arg Ile Asp Arg Ala Ser Lys Tyr Arg Thr Pro Gln Asp Asn Thr  
 420 425 430  
 Gln Leu Gln Asp Leu Tyr Asn Ala Thr Trp Val Val Ser Leu Val Met  
 435 440 445  
 Asp  
 <210> 22  
 <211> 589  
 <212> PRT  
 <213> Trichomonas vaginalis  
 <400> 22  
 Ala Ser Thr Gly Ile Asn Ser Thr Ala Asn Ile Leu Arg Asn Ile Thr  
 1 5 10 15  
 Val Thr Val Asn Gly Lys Pro Leu Glu Ala Lys Lys Gly Glu Thr Val  
 20 25 30  
 Leu Glu Leu Cys Asp Arg Asn Asn Ile Arg Ile Pro Arg Leu Cys Phe  
 35 40 45  
 His Pro Asn Leu Pro Pro Lys Ala Ser Cys Arg Val Cys Leu Val Glu  
 50 55 60  
 Cys Asp Gly Lys Trp Leu Ser Pro Ala Cys Val Thr Thr Val Trp Asp  
 65 70 75 80  
 Gly Leu Lys Ile Asp Thr Lys Ser Lys Asn Val Arg Asp Ser Val Glu  
 85 90 95  
 Asn Asn Leu Lys Glu Leu Leu Asp Cys His Asp Glu Thr Cys Ser Ala  
 100 105 110  
 Cys Ile Ala Asn His Arg Cys Gln Phe Arg Asp Met Asn Val Ala Tyr  
 115 120 125

Ser Val Lys Ala Glu Thr Lys Glu Ile Cys Ser Glu Glu Gly Ile Asp  
 130 135 140  
 Glu Ser Thr Asn Ala Ile Arg Leu Asp Thr Ser Lys Cys Val Leu Cys  
 145 150 155 160  
 Gly Arg Cys Ile Arg Ala Cys Glu Glu Val Ala Gly Thr Ser Ala Ile  
 165 170 175  
 Ile Phe Gly Asn Arg Ala Lys Lys Met Arg Ile Gln Pro Thr Phe Gly  
 180 185 190  
 Val Thr Leu Gln Glu Thr Ser Cys Ile Lys Cys Gly Gln Cys Thr Leu  
 195 200 205  
 Tyr Cys Pro Val Gly Ala Ile Thr Glu Lys Ser Gln Val Lys Glu Ala  
 210 215 220  
 Leu Asp Ile Leu Ala Asn Lys Gly Lys Lys Ile Thr Val Val Gln Val  
 225 230 235 240  
 Ala Pro Ala Val Arg Val Ala Leu Ser Glu Ala Phe Gly Tyr Lys Glu  
 245 250 255  
 Gly Thr Val Thr Thr Gly Lys Met Val Ser Ala Leu Lys Ala Leu Gly  
 260 265 270  
 Phe Asp Leu Val Tyr Asp Thr Asn Tyr Gly Ala Asp Leu Thr Ile Cys  
 275 280 285  
 Glu Glu Ala Gly Glu Leu Val Asn Arg Leu Arg Asp Pro Asn Ala Lys  
 290 295 300  
 Phe Pro Met Phe Thr Thr Cys Cys Pro Ala Trp Val Asn Tyr Val Glu  
 305 310 315 320  
 Gln Ser Ala Pro Asp Phe Ile Pro Asn Leu Ser Ser Cys Arg Ser Pro  
 325 330 335  
 Gln Gly Met Leu Ser Ala Leu Ile Lys Asn Tyr Leu Pro Lys Leu Leu  
 340 345 350  
 Asp Val Lys Gln Glu Asp Val Leu Asn Phe Ser Ile Met Pro Cys Thr  
 355 360 365  
 Ala Lys Lys Asp Glu Val Glu Arg Pro Glu Leu Arg Thr Lys Ser Gly  
 370 375 380  
 Leu Lys Glu Thr Asp Met Val Leu Thr Val Arg Glu Leu Val Glu Met  
 385 390 395 400



Ile Lys Leu Ser Asn Ile Asp Phe Asn Asn Leu Pro Asp Thr Gln Phe  
 405 410 415

Asp Asn Ile Phe Gly Phe Gly Ser Gly Ala Gly Gln Ile Phe Ala Ala  
 420 425 430

Thr Gly Gly Val Met Glu Ala Ala Ser Arg Thr Ala Phe Glu Val Tyr  
 435 440 445

Thr Gly Lys Lys Leu Thr Asn Val Asn Ile Tyr Pro Val Arg Gly Met  
 450 455 460

Asp Gly Leu Arg Ile Ala Glu Leu Asp Leu Asp Gly Thr Lys Leu Lys  
 465 470 475 480

Val Ala Val Cys His Gly Ile Ala Asn Thr Ala Lys Leu Leu Asp Arg  
 485 490 495

Leu Arg Glu Lys Asp Pro Glu Leu Met Asp Ile Lys Phe Ile Glu Ile  
 500 505 510

Met Ala Cys Pro Gly Gly Cys Val Cys Gly Gly Gly Thr Pro Gln Pro  
 515 520 525

Lys Asn Arg Val Ser Leu Asp Asn Arg Leu Ala Ala Ile Tyr Asn Ile  
 530 535 540

Asp Ala Lys Met Glu Cys Arg Lys Ser His Glu Asn Pro Leu Ile Lys  
 545 550 555 560

Gly Val Tyr Lys Glu Phe Leu Gly Lys Pro Asn Ser His Leu Ala His  
 565 570 575

Glu Leu Leu His Thr His Phe Lys His His Pro Lys Trp  
 580 585

<210> 23  
 <211> 582  
 <212> PRT  
 <213> Trichomonas vaginalis

<400> 23

Met Lys Thr Ile Ile Leu Asn Gly Asn Glu Val His Thr Asp Lys Asp  
 1 5 10 15

Ile Thr Ile Leu Glu Leu Ala Arg Glu Asn Asn Val Asp Ile Pro Thr  
 20 25 30

Leu Cys Phe Leu Lys Asp Cys Gly Asn Phe Gly Lys Cys Gly Val Cys  
 35 40 45

Met Val Glu Val Glu Gly Lys Gly Phe Arg Ala Ala Cys Val Ala Lys  
 50 55 60

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Val Glu Asp Gly Met Val Ile Asn Thr Glu Ser Asp Glu Val Lys Glu  
 65 70 75 80  
 Arg Ile Lys Lys Arg Val Ser Met Leu Leu Asp Lys His Glu Phe Lys  
 85 90 95  
 Cys Gly Gln Cys Ser Arg Arg Glu Asn Cys Glu Phe Leu Lys Leu Val  
 100 105 110  
 Ile Lys Thr Lys Ala Lys Ala Ser Lys Pro Phe Leu Pro Glu Asp Lys  
 115 120 125  
 Asp Ala Leu Val Asp Asn Arg Ser Lys Ala Ile Val Ile Asp Arg Ser  
 130 135 140  
 Lys Cys Val Leu Cys Gly Arg Cys Val Ala Ala Cys Lys Gln His Thr  
 145 150 155 160  
 Ser Thr Cys Ser Ile Gln Phe Ile Lys Lys Asp Gly Gln Arg Ala Val  
 165 170 175  
 Gly Thr Val Asp Asp Val Cys Leu Asp Asp Ser Thr Cys Leu Leu Cys  
 180 185 190  
 Gly Gln Cys Val Ile Ala Cys Pro Val Ala Ala Leu Lys Glu Lys Ser  
 195 200 205  
 His Ile Glu Lys Val Gln Glu Ala Leu Asn Asp Pro Lys Lys His Val  
 210 215 220  
 Ile Val Ala Met Ala Pro Ser Val Arg Thr Ala Met Gly Glu Leu Phe  
 225 230 235 240  
 Lys Met Gly Tyr Gly Lys Asp Val Thr Gly Lys Leu Tyr Thr Ala Leu  
 245 250 255  
 Arg Met Leu Gly Phe Asp Lys Val Phe Asp Ile Asn Phe Gly Ala Asp  
 260 265 270  
 Met Thr Ile Met Glu Glu Ala Thr Glu Leu Leu Gly Arg Val Lys Asn  
 275 280 285  
 Asn Gly Pro Phe Pro Met Phe Thr Ser Cys Cys Pro Ala Trp Val Arg  
 290 295 300  
 Leu Ala Gln Asn Tyr His Pro Glu Leu Leu Asp Asn Leu Ser Ser Ala  
 305 310 315 320  
 Lys Ser Pro Gln Gln Ile Phe Gly Thr Ala Ser Lys Thr Tyr Tyr Pro  
 325 330 335  
 Ser Ile Ser Gly Ile Ala Pro Glu Asp Val Tyr Thr Val Thr Ile Met

340

345

350

Pro Cys Asn Asp Lys Lys Tyr Glu Ala Asp Ile Pro Phe Met Glu Thr  
 355 360 365

Asn Ser Leu Arg Asp Ile Asp Ala Ser Leu Thr Thr Arg Glu Leu Ala  
 370 375 380

Lys Met Ile Lys Asp Ala Lys Ile Lys Phe Ala Asp Leu Glu Asp Gly  
 385 390 395 400

Glu Val Asp Pro Ala Met Gly Thr Tyr Ser Gly Ala Gly Ala Ile Phe  
 405 410 415

Gly Ala Thr Gly Gly Val Met Glu Ala Ala Ile Arg Ser Ala Lys Asp  
 420 425 430

Phe Ala Glu Asn Lys Glu Leu Glu Asn Val Asp Tyr Thr Glu Val Arg  
 435 440 445

Gly Phe Lys Gly Ile Lys Glu Ala Glu Val Glu Ile Ala Gly Asn Lys  
 450 455 460

Leu Asn Val Ala Val Ile Asn Gly Ala Ser Asn Phe Phe Glu Phe Met  
 465 470 475 480

Lys Ser Gly Lys Met Asn Glu Lys Gln Tyr His Phe Ile Glu Val Met  
 485 490 495

Ala Cys Pro Gly Gly Cys Ile Asn Gly Gly Gly Gln Pro His Val Asn  
 500 505 510

Ala Leu Asp Arg Glu Asn Val Asp Tyr Arg Lys Leu Arg Ala Ser Val  
 515 520 525

Leu Tyr Asn Gln Asp Lys Asn Val Leu Ser Lys Arg Lys Ser His Asp  
 530 535 540

Asn Pro Ala Ile Ile Lys Met Tyr Asp Ser Tyr Phe Gly Lys Pro Gly  
 545 550 555 560

Glu Gly Leu Ala His Lys Leu Leu His Val Lys Tyr Thr Lys Asp Lys  
 565 570 575

Asn Val Ser Lys His Glu  
 580

<210> 24  
 <211> 497  
 <212> PRT  
 <213> Chlamydomonas reinhardtii

<400> 24

Met Ser Ala Leu Val Leu Lys Pro Cys Ala Ala Val Ser Ile Arg Gly  
 1 5 10 15  
 Ser Ser Cys Arg Ala Arg Gln Val Ala Pro Arg Ala Pro Leu Ala Ala  
 20 25 30  
 Ser Thr Val Arg Val Ala Leu Ala Thr Leu Glu Ala Pro Ala Arg Arg  
 35 40 45  
 Leu Gly Asn Val Ala Cys Ala Ala Ala Ala Pro Ala Ala Glu Ala Pro  
 50 55 60  
 Leu Ser His Val Gln Gln Ala Leu Ala Glu Leu Ala Lys Pro Lys Asp  
 65 70 75 80  
 Asp Pro Thr Arg Lys His Val Cys Val Gln Val Ala Pro Ala Val Arg  
 85 90 95  
 Val Ala Ile Ala Glu Thr Leu Gly Leu Ala Pro Gly Ala Thr Thr Pro  
 100 105 110  
 Lys Gln Leu Ala Glu Gly Leu Arg Arg Leu Gly Phe Asp Glu Val Phe  
 115 120 125  
 Asp Thr Leu Phe Gly Ala Asp Leu Thr Ile Met Glu Glu Gly Ser Glu  
 130 135 140  
 Leu Leu His Arg Leu Thr Glu His Leu Glu Ala His Pro His Ser Asp  
 145 150 155 160  
 Glu Pro Leu Pro Met Phe Thr Ser Cys Cys Pro Gly Trp Ile Ala Met  
 165 170 175  
 Leu Glu Lys Ser Tyr Pro Asp Leu Ile Pro Tyr Val Ser Ser Cys Lys  
 180 185 190  
 Ser Pro Gln Met Met Leu Ala Ala Met Val Lys Ser Tyr Leu Ala Glu  
 195 200 205  
 Lys Lys Gly Ile Ala Pro Lys Asp Met Val Met Val Ser Ile Met Pro  
 210 215 220  
 Cys Thr Arg Lys Gln Ser Glu Ala Asp Arg Asp Trp Phe Cys Val Asp  
 225 230 235 240  
 Ala Asp Pro Thr Leu Arg Gln Leu Asp His Val Ile Thr Thr Val Glu  
 245 250 255  
 Leu Gly Asn Ile Phe Lys Glu Arg Gly Ile Asn Leu Ala Glu Leu Pro  
 260 265 270  
 Glu Gly Glu Trp Asp Asn Pro Met Gly Val Gly Ser Gly Ala Gly Val  
 275 280 285

Leu Phe Gly Thr Thr Gly Gly Val Met Glu Ala Ala Leu Arg Thr Ala  
290 295 300

Tyr Glu Leu Phe Thr Gly Thr Pro Leu Pro Arg Leu Ser Leu Ser Glu  
305 310 315 320

Val Arg Gly Met Asp Gly Ile Lys Glu Thr Asn Ile Thr Met Val Pro  
325 330 335

Ala Pro Gly Ser Lys Phe Glu Glu Leu Leu Lys His Arg Ala Ala Ala  
340 345 350

Arg Ala Glu Ala Ala Ala His Gly Thr Pro Gly Pro Leu Ala Trp Asp  
355 360 365

Gly Gly Ala Gly Phe Thr Ser Glu Asp Gly Arg Gly Gly Ile Thr Leu  
370 375 380

Arg Val Ala Val Ala Asn Gly Leu Gly Asn Ala Lys Lys Leu Ile Thr  
385 390 395 400

Lys Met Gln Ala Gly Glu Ala Lys Tyr Asp Phe Val Glu Ile Met Ala  
405 410 415

Cys Pro Ala Gly Cys Val Gly Gly Gly Gly Gln Pro Arg Ser Thr Asp  
420 425 430

Lys Ala Ile Thr Gln Lys Arg Gln Ala Ala Leu Tyr Asn Leu Asp Glu  
435 440 445

Lys Ser Thr Leu Arg Arg Ser His Glu Asn Pro Ser Ile Arg Glu Leu  
450 455 460

Tyr Asp Thr Tyr Leu Gly Glu Pro Leu Gly His Lys Ala His Glu Leu  
465 470 475 480

Leu His Thr His Tyr Val Ala Gly Gly Val Glu Glu Lys Asp Glu Lys  
485 490 495

Lys

<210> 25  
<211> 415  
<212> PRT  
<213> Chlorella fusca

<400> 25

Ala Gly Pro Thr Ser Glu Cys Asp Cys Pro Pro Thr Pro Gln Ala Lys  
1 5 10 15

Leu Pro His Trp Gln Gln Ala Leu Asp Glu Leu Ala Lys Pro Lys Glu

Ser Arg Arg Leu Met Ile Ala Gln Ile Ala Ser Ala Val Arg Val Ala  
 35 40 45  
 Ile Ala Glu Thr Ile Gly Leu Ala Pro Gly Asp Val Thr Ile Gly Gln  
 50 55 60  
 Leu Val Thr Gly Leu Arg Met Leu Gly Phe Asp Tyr Val Phe Asp Thr  
 65 70 75 80  
 Leu Phe Gly Ala Asp Leu Thr Ile Met Glu Glu Gly Thr Glu Leu Leu  
 85 90 95  
 His Arg Leu Gln Asp His Leu Glu Gln His Pro Asn Lys Glu Glu Pro  
 100 105 110  
 Leu Pro Met Phe Thr Ser Cys Cys Pro Gly Trp Val Ala Met Val Glu  
 115 120 125  
 Lys Ser Asn Pro Glu Leu Ile Pro Tyr Leu Ser Ser Cys Lys Ser Pro  
 130 135 140  
 Gln Met Met Leu Gly Ala Val Ile Lys Asn Tyr Tyr Ala Gln Gln Val  
 145 150 155 160  
 Gly Val Gln Pro Ser Asp Ile Cys Asn Val Ser Val Met Pro Cys Val  
 165 170 175  
 Arg Lys Gln Gly Glu Ala Asp Arg Glu Trp Phe Asn Thr Thr Gly Ala  
 180 185 190  
 Gly Leu Ala Arg Asp Val Asp His Val Val Thr Thr Ala Glu Val Gly  
 195 200 205  
 Lys Ile Phe Leu Glu Arg Gly Ile Lys Leu Asn Glu Leu Pro Glu Ser  
 210 215 220  
 Asn Phe Asp Asn Pro Ile Gly Glu Gly Thr Gly Gly Ala Leu Leu Phe  
 225 230 235 240  
 Gly Thr Thr Gly Gly Val Met Glu Ala Ala Leu Arg Thr Val Tyr Glu  
 245 250 255  
 Val Val Thr Gln Lys Pro Met Gly Arg Val Asp Phe Glu Glu Val Arg  
 260 265 270  
 Gly Leu Glu Gly Ile Lys Glu Ala Glu Ile Thr Leu Lys Pro Gly Asp  
 275 280 285  
 Asp Ser Pro Phe Lys Ala Phe Ala Gly Ala Asp Gly Gln Gly Ile Thr  
 290 295 300

061010 third listing.txt

Leu Lys Ile Ala Val Ala Asn Gly Leu Gly Asn Ala Lys Lys Leu Ile  
 305 310 315 320  
 Lys Ser Leu Ser Glu Gly Lys Ala Lys Tyr Asp Phe Ile Glu Val Met  
 325 330 335  
 Ala Cys Pro Gly Gly Cys Ile Gly Gly Gly Gly Gln Pro Arg Ser Thr  
 340 345 350  
 Asp Lys Gln Ile Leu Gln Lys Arg Gln Gln Ala Met Tyr Asn Leu Asp  
 355 360 365  
 Glu Arg Ser Thr Ile Arg Arg Ser His Asp Asn Pro Phe Ile Gln Ala  
 370 375 380  
 Leu Tyr Asp Lys Phe Leu Gly Ala Pro Asn Ser His Lys Ala His Asp  
 385 390 395 400  
 Leu Leu His Thr His Tyr Val Ala Gly Gly Ile Pro Glu Glu Lys  
 405 410 415  
 <210> 26  
 <211> 505  
 <212> PRT  
 <213> Chlamydomonas reinhardtii  
 <400> 26  
 Met Ala Leu Gly Leu Leu Ala Glu Leu Arg Ala Gly Gln Ala Val Ala  
 1 5 10 15  
 Cys Ala Arg Arg Thr Asn Ala Pro Ala His Pro Ala Ala Val Val Pro  
 20 25 30  
 Cys Leu Pro Ser Arg Ala Gly Lys Phe Phe Asn Leu Ser Gln Lys Val  
 35 40 45  
 Pro Ser Ser Gln Ser Ala Arg Gly Ser Thr Ile Arg Val Ala Ala Thr  
 50 55 60  
 Ala Thr Asp Ala Val Pro His Trp Lys Leu Ala Leu Glu Glu Leu Asp  
 65 70 75 80  
 Lys Pro Lys Asp Gly Gly Arg Lys Val Leu Ile Ala Gln Val Ala Pro  
 85 90 95  
 Ala Val Arg Val Ala Ile Ala Glu Ser Phe Gly Leu Ala Pro Gly Ala  
 100 105 110  
 Val Ser Pro Gly Lys Leu Ala Thr Gly Leu Arg Ala Leu Gly Phe Asp  
 115 120 125  
 Gln Val Phe Asp Thr Leu Phe Ala Ala Asp Leu Thr Ile Met Glu Glu  
 130 135 140

061010 third listing.txt

Gly Thr Glu Leu Leu His Arg Leu Lys Glu His Leu Glu Ala His Pro  
 145 150 155 160  
 His Ser Asp Glu Pro Leu Pro Met Phe Thr Ser Cys Cys Pro Gly Trp  
 165 170 175  
 Val Ala Met Met Glu Lys Ser Tyr Pro Glu Leu Ile Pro Phe Val Ser  
 180 185 190  
 Ser Cys Lys Ser Pro Gln Met Met Met Gly Ala Met Val Lys Thr Tyr  
 195 200 205  
 Leu Ser Glu Lys Gln Gly Ile Pro Ala Lys Asp Ile Val Met Val Ser  
 210 215 220  
 Val Met Pro Cys Val Arg Lys Gln Gly Glu Ala Asp Arg Glu Trp Phe  
 225 230 235 240  
 Cys Val Ser Glu Pro Gly Val Arg Asp Val Asp His Val Ile Thr Thr  
 245 250 255  
 Ala Glu Leu Gly Asn Ile Phe Lys Glu Arg Gly Ile Asn Leu Pro Glu  
 260 265 270  
 Leu Pro Asp Ser Asp Trp Asp Gln Pro Leu Gly Leu Gly Ser Gly Ala  
 275 280 285  
 Gly Val Leu Phe Gly Thr Thr Gly Gly Val Met Glu Ala Ala Leu Arg  
 290 295 300  
 Thr Ala Tyr Glu Ile Val Thr Lys Glu Pro Leu Pro Arg Leu Asn Leu  
 305 310 315 320  
 Ser Glu Val Arg Gly Leu Asp Gly Ile Lys Glu Ala Ser Val Thr Leu  
 325 330 335  
 Val Pro Ala Pro Gly Ser Lys Phe Ala Glu Leu Val Ala Glu Arg Leu  
 340 345 350  
 Ala His Lys Val Glu Glu Ala Ala Ala Glu Ala Ala Ala Val  
 355 360 365  
 Glu Gly Ala Val Lys Pro Pro Ile Ala Tyr Asp Gly Gly Gln Gly Phe  
 370 375 380  
 Ser Thr Asp Asp Gly Lys Gly Gly Leu Lys Leu Arg Val Ala Val Ala  
 385 390 395 400  
 Asn Gly Leu Gly Asn Ala Lys Lys Leu Ile Gly Lys Met Val Ser Gly  
 405 410 415



Glu Ala Lys Tyr Asp Phe Val Glu Ile Met Ala Cys Pro Ala Gly Cys  
 420 425 430

Val Gly Gly Gly Gly Gln Pro Arg Ser Thr Asp Lys Gln Ile Thr Gln  
 435 440 445

Lys Arg Gln Ala Ala Leu Tyr Asp Leu Asp Glu Arg Asn Thr Leu Arg  
 450 455 460

Arg Ser His Glu Asn Glu Ala Val Asn Gln Leu Tyr Lys Glu Phe Leu  
 465 470 475 480

Gly Glu Pro Leu Ser His Arg Ala His Glu Leu Leu His Thr His Tyr  
 485 490 495

Val Pro Gly Gly Ala Glu Ala Asp Ala  
 500 505

<210> 27  
 <211> 403  
 <212> PRT  
 <213> Scenedesmus obliquus  
 <400> 27

Pro His Trp Gln Gln Thr Leu Asp Glu Leu Ala Lys Pro Lys Glu Arg  
 1 5 10 15

Lys Val Met Ile Ala Gln Ile Ala Pro Ala Val Arg Gly Ile Ala Glu  
 20 25 30

Thr Met Gly Leu Asn Pro Gly Asp Val Thr Val Gly Gln Met Val Thr  
 35 40 45

Gly Leu Arg Met Leu Gly Phe Asp Tyr Val Phe Asp Thr Leu Phe Gly  
 50 55 60

Ala Asp Leu Thr Ile Met Glu Glu Gly Thr Glu Leu Leu His Arg Leu  
 65 70 75 80

Gln Asp His Leu Glu Gln His Pro Asn Lys Glu Glu Pro Leu Pro Met  
 85 90 95

Phe Thr Ser Cys Cys Pro Gly Trp Val Ala Met Val Glu Lys Ser Asn  
 100 105 110

Pro Glu Leu Ile Pro Tyr Leu Ser Ser Cys Lys Ser Pro Gln Met Met  
 115 120 125

Leu Gly Ala Val Ile Lys Asn Tyr Phe Ala Ala Glu Ala Gly Ala Lys  
 130 135 140

Pro Glu Asp Ile Cys Asn Val Ser Val Met Pro Cys Val Arg Lys Ser  
 145 150 155 160

061010 third listing.txt

Gly Glu Ala Glu Pro Arg Ser Gly Ser Thr His His Arg Ala Gly Arg  
165 170 175

Arg Asp Val Asp His Val Met Thr Thr Ala Glu Leu Gly Lys Ile Phe  
180 185 190

Val Glu Arg Gly Ile Lys Leu Asn Glu Leu Gln Glu Ser Pro Phe Asp  
195 200 205

Asn Pro Val Gly Glu Gly Ser Gly Gly Gly Leu Leu Phe Gly Thr Thr  
210 215 220

Gly Gly Val Met Glu Ala Ala Leu Arg Thr Val Tyr Glu Val Val Thr  
225 230 235 240

Ala Glu Ala Leu Gly Pro Gln Arg Ser Ser Leu Thr Thr Ser Thr Ala  
245 250 255

Trp Thr Pro Ala Gln Arg Ala Ser Pro Arg Pro Ser Pro Gln Ala Pro  
260 265 270

Thr Ala Pro Ser Arg Pro Leu Gln Ala Gln Thr Glu Ser Gly Ile Thr  
275 280 285

Leu Asn Ile Ala Val Ala Asn Gly Leu Gly Asn Ala Lys Lys Leu Ile  
290 295 300

Lys Gln Leu Ala Ala Gly Glu Ser Lys Tyr Asp Phe Thr Glu Val Met  
305 310 315 320

Ala Cys Pro Gly Gly Cys Ile Gly Gly Gly Gln Pro Gln Arg Asn  
325 330 335

Lys Gln Ile Leu Gln Lys Arg Gln Ala Ala Met Tyr Asp Leu Asp Glu  
340 345 350

Arg Ala Val Ile Arg Arg Thr Glu Asn Pro Leu Ile Gly Ala Leu Tyr  
355 360 365

Glu Lys Phe Leu Gly Glu Pro Asn Gly His Lys Ala His Glu Leu Leu  
370 375 380

His Thr His Tyr Val Ala Gly Gly Val Pro Asp Arg Arg Ser Glu Gly  
385 390 395 400

Glu Ala Trp

<210> 28  
<211> 581  
<212> PRT  
<213> Thermoanaerobacter tengcongensis strain MB4T

&lt;400&gt; 28

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Met Asp Lys Val Arg Val Thr Ile Asp Gly Ile Thr Val Glu Val Pro
1      5      10      15

Ser Tyr Tyr Thr Val Leu Glu Ala Ala Lys Glu Ala Gly Ile Asp Ile
20      25      30

Pro Thr Leu Cys Tyr Leu Lys Glu Ile Asn Gln Ile Gly Ala Cys Arg
35      40      45

Ile Cys Leu Val Glu Ile Glu Gly Val Arg Asn Leu Gln Thr Ser Cys
50      55      60

Thr Tyr Pro Val Phe Asp Gly Met Lys Val Tyr Thr Asn Thr Pro Lys
65      70      75      80

Ile Arg Glu Ala Arg Arg Leu Asn Leu Glu Leu Ile Leu Ser Asn His
85      90      95

Asp Arg Asn Cys Leu Thr Cys Val Arg Ser Thr Asn Cys Glu Leu Gln
100     105     110

Ala Leu Ala Lys Arg Leu Gly Val Glu Glu Ile Arg Phe Glu Gly Glu
115     120     125

Asn Ile Lys Tyr Pro Ile Asp Asp Ala Ser Pro Ala Val Val Arg Asp
130     135     140

Pro Asn Lys Cys Val Leu Cys Arg Arg Cys Val Ala Val Cys Ser Glu
145     150     155     160

Val Gln Asn Val Phe Ala Ile Gly Met Val Asn Arg Gly Phe Lys Thr
165     170     175

Met Val Ala Pro Ser Phe Gly Arg Ser Leu Lys Asp Ser Pro Cys Ile
180     185     190

Ser Cys Gly Gln Cys Ile Met Val Cys Pro Val Gly Ala Ile Tyr Glu
195     200     205

Lys Asp His Thr Lys Arg Val Tyr Glu Ala Leu Ala Asp Asp Lys Lys
210     215     220

Tyr Val Val Ala Gln Thr Ala Pro Ala Val Arg Val Ala Leu Gly Glu
225     230     235     240

Glu Phe Gly Met Pro Val Gly Thr Ile Val Thr Gly Lys Met Ala Ala
245     250     255

Ala Leu Arg Arg Met Gly Phe Asp Ala Val Phe Asp Thr Asn Phe Ala
260     265     270

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Ala Asp Leu Thr Ile Met Glu Glu Gly Ser Glu Leu Leu Glu Arg Ile  
 275 280 285

Lys His Gly Gly Lys Leu Pro Met Ile Thr Ser Cys Ser Pro Gly Trp  
 290 295 300

Ile Ala Phe Cys Glu Lys Tyr Tyr Pro Glu Phe Ile Asp Asn Leu Ser  
 305 310 315 320

Thr Cys Lys Ser Pro His Met Met Met Gly Ala Leu Val Lys Ser Tyr  
 325 330 335

Tyr Ala Glu Lys Lys Gly Leu Asp Pro Lys Asp Ile Phe Val Val Ser  
 340 345 350

Ile Met Pro Cys Thr Ala Lys Lys Leu Glu Ile Glu Arg Glu Glu Met  
 355 360 365

Ile Arg Asn Gly Met Lys Asp Val Asp Ala Val Leu Thr Thr Arg Glu  
 370 375 380

Leu Ala Arg Met Ile Lys Glu Met Gly Ile Asp Phe Val Asn Leu Lys  
 385 390 395 400

Asp Glu Glu Phe Asp Glu Pro Leu Gly Met Ser Thr Gly Ala Gly Ala  
 405 410 415

Ile Phe Gly Ala Thr Gly Gly Val Met Glu Ala Ala Leu Arg Thr Val  
 420 425 430

Ala Glu Ile Val Glu Gly Arg Asp Ile Gly Lys Ile Asp Phe Glu Glu  
 435 440 445

Val Arg Gly Leu Glu Gly Val Arg Glu Ala Thr Ile Thr Ile Asp Gly  
 450 455 460

Met Asp Ile Lys Ile Ala Ile Ala Asn Gly Thr Gly Asn Ala Lys Lys  
 465 470 475 480

Leu Leu Asp Lys Val Lys Ala Gly Glu Val Glu Tyr His Phe Ile Glu  
 485 490 495

Val Met Gly Cys Pro Gly Gly Cys Ile Met Gly Gly Gly Gln Pro Ile  
 500 505 510

His Asn Pro Asn Glu Met Glu Glu Val Lys Lys Leu Arg Ala Lys Ala  
 515 520 525

Ile Tyr Glu Ile Asp Lys Asn Leu Pro Ile Arg Lys Ser His Glu Asn  
 530 535 540

Pro Ala Ile Lys Arg Leu Tyr Glu Glu Phe Leu Gly Tyr Pro Leu Ser  
 545 550 555 560

Glu Lys Ser His Glu Leu Leu His Thr His Tyr Ser Arg Lys Glu Leu  
 565 570 575

Tyr Pro Leu Val Lys  
 580

<210> 29  
 <211> 636  
 <212> PRT  
 <213> Neocallimastix frontalis

<400> 29

Met Ser Met Leu Ser Ser Val Leu Asn Lys Ala Val Val Asn Pro Lys  
 1 5 10 15

Leu Thr Arg Ser Leu Ala Thr Ala Ala Glu Lys Met Val Asn Ile  
 20 25 30

Ser Ile Asn Gly Arg Lys Phe Gln Val Lys Pro Lys Thr Thr Val Leu  
 35 40 45

Glu Ala Ala Lys Ala Asn Gly Tyr Tyr Ile Pro Thr Leu Cys Tyr His  
 50 55 60

Gln Glu Leu Pro Val Ala Gly Asn Cys Arg Leu Cys Leu Val Tyr Ala  
 65 70 75 80

Lys Gly Ser Trp Lys Pro Leu Thr Ala Cys Thr Thr Glu Val Trp Glu  
 85 90 95

Gly Met Glu Ile Glu Thr Asp Ser Pro Ala Val Ile Glu Thr Val Arg  
 100 105 110

Ser Ser Leu Ser Met Met Arg Glu Glu His Pro Asn Asp Cys Met Thr  
 115 120 125

Cys Gly Ser Asn Gly Asp Cys Glu Phe Gln Asp Leu Ile Tyr Arg Tyr  
 130 135 140

Gln Ile Asp Ala Lys His Pro Val Arg Ser Leu Leu Lys His Lys Ser  
 145 150 155 160

Lys Lys Thr Asn His Ser Ile Thr Glu Pro Cys Tyr Ser Pro Phe Asp  
 165 170 175

Asn Thr Thr Phe Ser Val Ala Arg Asp Met Asn Lys Cys Val Lys Cys  
 180 185 190

Gly Arg Cys Ile Arg Ala Cys His His Phe Gln Asn Ile Asn Ile Leu  
 195 200 205

Gly Phe Ile Asn Arg Ala Gly Tyr Glu Arg Val Gly Thr Pro Met Asp

210

215

220

Arg Pro Met Asn Phe Thr Lys Cys Val Glu Cys Gly Gln Cys Ser Gln  
 225 230 235 240

Val Cys Pro Val Gly Ala Ile Thr Ala Arg Thr Glu Val Val Asp Val  
 245 250 255

Leu Arg His Leu Asp Thr Lys Arg Lys Val Val Val Cys Ser Thr Ala  
 260 265 270

Pro Ala Ile Arg Val Ala Pro Ala Glu Glu Phe Ser Thr Glu Ala Asp  
 275 280 285

Phe Asp Phe Thr Gly Lys Met Val Ala Gly Leu Arg Lys Leu Gly Phe  
 290 295 300

Asp Tyr Ile Phe Asp Thr Asn Phe Ser Ala Asp Leu Thr Ile Met Glu  
 305 310 315 320

Glu Gly Thr Glu Leu Ile Asp Arg Leu Asn Asn Gly Gly Lys Phe Pro  
 325 330 335

Met Phe Thr Ser Cys Cys Pro Gly Trp Ile Asn Met Val Glu Lys Ser  
 340 345 350

Tyr Pro Glu Leu Ser Asp Asn Leu Ser Ser Cys Lys Ser Pro Gln Gln  
 355 360 365

Met Ile Gly Ala Val Ile Lys Ser Tyr Phe Ala Lys Lys Leu Gly Leu  
 370 375 380

Ser Thr Glu Asp Ile Ile His Val Ser Ile Met Pro Cys Thr Ala Lys  
 385 390 395 400

Lys Gly Glu Ala Arg Arg Pro Glu Phe Val Gln Lys Gly Lys Asp Gly  
 405 410 415

Lys Asp Tyr Pro Asp Ile Asp Tyr Val Ile Thr Thr Arg Glu Leu Leu  
 420 425 430

Thr Leu Leu Lys Leu Lys Lys Ile Asn Pro Ala Glu Leu Pro Asp Asp  
 435 440 445

Lys Phe Asp Ser Pro Leu Gly Ile Gly Ser Ser Ala Gly Asn Leu Phe  
 450 455 460

Gly Val Thr Gly Gly Val Met Glu Ala Ala Ile Arg Thr Ala Gln Val  
 465 470 475 480

Ile Thr Gly Val Glu Asn Pro Ile Pro Leu Gly Glu Leu Lys Ala Ile  
 485 490 495

061010 third listing.txt

Arg Gly Leu Asp Gly Ile Lys Ala Ala Asn Val Pro Leu Lys Thr Lys  
500 505 510

Asp Gly Lys Glu Val Ser Val Arg Ala Ala Val Val Ser Gly Gly Ala  
515 520 525

Asn Ile Gln Lys Phe Leu Glu Lys Ile Lys Asn Lys Glu Leu Glu Phe  
530 535 540

Asp Phe Ile Glu Met Met Met Cys Pro Gly Gly Cys Ile Asn Gly Gly  
545 550 555 560

Gly Gln Pro Lys Ser Ala Asp Pro Glu Ile Val Ala Lys Lys Met Gln  
565 570 575

Arg Met Tyr Thr Met Asp Asp Gln Ala Lys Leu Arg Leu Cys His Glu  
580 585 590

Asn Pro Glu Ile Ile Asp Val Tyr Lys Asn Phe Leu Gly Glu Pro Asn  
595 600 605

Ser His Leu Ala His Glu Leu Leu His Thr His Tyr Asn Asp Arg Ser  
610 615 620

Lys Thr Ile His Asp Met Gly His His Glu Lys Lys  
625 630 635

<210> 30  
<211> 555  
<212> PRT  
<213> Piromyces sp. E2

<400> 30

Cys Leu Val Asp Val Lys Gly Ser Trp Lys Pro Leu Thr Ala Cys Thr  
1 5 10 15

Thr Glu Val Trp Glu Gly Met Glu Ile Glu Thr Asp Thr Pro Ala Val  
20 25 30

Arg Glu Thr Val Arg Ser Ser Leu Ala Met Met Arg Glu Glu His Pro  
35 40 45

Asn Asp Cys Met Thr Cys Glu Ser Asn Gly Asn Cys Glu Phe Gln Asp  
50 55 60

Leu Ile Tyr Arg Tyr Gln Ile Asp Ala Gln His Pro Val Arg Thr Leu  
65 70 75 80

Leu Arg Asn Lys Phe Lys Lys Thr Asn His Ser Ile Thr Glu Pro Cys  
85 90 95

Tyr Ser Pro Phe Asp Asp Ser Thr Phe Ser Ile Ser Arg Asp Met Asn  
100 105 110

Lys Cys Val Lys Cys Gly Arg Cys Val Arg Ala Cys His His Phe Gln  
 115 120 125  
 Asn Ile Asn Ile Leu Gly Phe Ile Asn Arg Ala Gly Tyr Glu Arg Val  
 130 135 140  
 Gly Thr Pro Met Asp Arg Pro Met Asn Phe Thr Lys Cys Val Glu Cys  
 145 150 155 160  
 Gly Gln Cys Ser Gln Val Cys Pro Val Gly Ala Ile Thr Glu Arg Asn  
 165 170 175  
 Glu Cys Ile Glu Val Leu Arg His Leu Asp Thr Lys Arg Lys Ile Val  
 180 185 190  
 Val Val Ser Thr Ala Pro Ala Ile Arg Val Ala Leu Ala Glu Glu Phe  
 195 200 205  
 Asn Ala Glu Pro Asp Phe Asp Phe Thr Gly Lys Met Val Ala Gly Leu  
 210 215 220  
 Lys Lys Leu Gly Phe Asp Tyr Ile Phe Asp Thr Asn Phe Ser Ala Asp  
 225 230 235 240  
 Leu Thr Ile Met Glu Glu Gly Thr Glu Leu Ile Thr Arg Leu Asn Glu  
 245 250 255  
 Gly Gly Lys Phe Pro Met Phe Thr Ser Cys Cys Pro Gly Trp Ile Asn  
 260 265 270  
 Met Val Glu Lys Ser Tyr Pro Glu Ile Arg Asp Asn Leu Ser Ser Cys  
 275 280 285  
 Lys Ser Pro Gln Gln Met Ile Gly Ala Val Ile Lys Thr Tyr Phe Ala  
 290 295 300  
 Lys Lys Ile Asn Ala Lys Pro Glu Asp Ile Ile His Val Ser Val Met  
 305 310 315 320  
 Pro Cys Thr Ala Lys Lys Gly Glu Ala Lys Arg Pro Glu Phe Lys Arg  
 325 330 335  
 Asp Gly Val Pro Asp Ile Asp His Val Ile Thr Thr Arg Glu Leu Ile  
 340 345 350  
 Thr Leu Leu Lys Leu Lys Arg Ile Asn Pro Ser Glu Leu Lys Asn Glu  
 355 360 365  
 Lys Phe Asp Ser Pro Leu Gly Ile Gly Ser Ser Ala Gly Asn Leu Phe  
 370 375 380



Gly Val Thr Gly Gly Val Met Glu Ala Ala Val Arg Thr Ala Gln Ile  
385 390 395 400

Ile Thr Gly Val Glu Asn Pro Ile Pro Leu Gly Glu Leu Lys Ala Ile  
405 410 415

Arg Gly Leu Asp Gly Ile Lys Ala Ala Ser Val Pro Leu Lys Thr Lys  
420 425 430

Asp Gly Lys Asp Val Asn Val Arg Ala Ala Val Val Ser Gly Gly Ala  
435 440 445

Asn Ile Gln Lys Phe Leu Glu Lys Leu Lys Lys Lys Glu Leu Glu Phe  
450 455 460

Asp Phe Val Glu Met Met Met Cys Pro Gly Gly Cys Ile Asn Gly Gly  
465 470 475 480

Gly Gln Pro Lys Ser Ala Asp Pro Lys Val Val Ala Lys Lys Met Glu  
485 490 495

Arg Met Tyr Thr Met Asp Asp Gln Ala Ser Leu Arg Leu Ser His Glu  
500 505 510

Asn Pro Glu Ile Thr Gln Ile Tyr Lys Glu Phe Leu Lys Glu Pro Asn  
515 520 525

Gly His Leu Ser His Glu Leu Leu His Thr His Tyr Asn Asp Arg Ser  
530 535 540

Lys Ala Ile Gln Asp Met Ser Leu His Gln Lys  
545 550 555

<210> 31  
<211> 389  
<212> PRT  
<213> Neocallimastix frontalis

<400> 31

Thr Glu Arg Asn Glu Val Ile Glu Val Leu Arg Gln Leu Asp Ser Lys  
1 5 10 15

Arg Lys Ile Leu Val Cys Ser Thr Ala Pro Ala Ile Arg Val Ala Leu  
20 25 30

Ala Glu Glu Phe Asn Ala Asp Pro Asp Phe Asn Phe Thr Gly Lys Met  
35 40 45

Val Ala Gly Leu Arg Lys Leu Gly Phe Asp Tyr Ile Phe Asp Thr Asn  
50 55 60

Phe Ser Ala Asp Leu Thr Ile Met Glu Glu Gly Thr Glu Leu Ile Asn  
65 70 75 80

061010 third listing.txt

Arg Leu Asn Asn Gly Gly Lys Phe Pro Met Phe Thr Ser Cys Cys Pro  
85 90 95

Gly Trp Ile Asn Met Val Glu Lys Ser Tyr Pro Glu Leu Arg Glu Asn  
100 105 110

Leu Ser Thr Cys Lys Ser Pro Gln Gln Met Ile Gly Ala Leu Ile Lys  
115 120 125

Ser Tyr Phe Ala Lys Lys Leu Gly Val Ser Thr Glu Asp Ile Ile His  
130 135 140

Val Ser Val Met Pro Cys Thr Ala Lys Lys Gly Glu Ala Lys Arg Pro  
145 150 155 160

Glu Phe Val Gln Lys Gly Lys Asp Gly Lys Asn Tyr Pro Asp Ile Asp  
165 170 175

Tyr Val Leu Thr Thr Arg Glu Leu Leu Thr Leu Met Lys Leu Lys Lys  
180 185 190

Val Asn Pro Ala Glu Leu Ala Asp Asp Lys Leu Asp Ser Pro Leu Gly  
195 200 205

Ile Ser Ser Ser Ala Gly Asn Leu Phe Gly Val Thr Gly Gly Val Met  
210 215 220

Glu Ala Ala Val Arg Thr Ala Gln Ile Ile Thr Gly Val Glu Asn Pro  
225 230 235 240

Ile Pro Leu Gly Glu Leu Lys Ala Val Arg Gly Leu Glu Gly Ile Lys  
245 250 255

Ala Ala Thr Val Pro Leu Lys Thr Lys Glu Gly Lys Asp Ile Asn Val  
260 265 270

Arg Ala Ala Val Val Ser Gly Gly Ala Asn Ile Gln Lys Phe Leu Glu  
275 280 285

Lys Ile Lys Asn Lys Glu Val Glu Phe Asp Phe Val Glu Met Met Met  
290 295 300

Cys Pro Gly Gly Cys Ile Asn Gly Gly Gly Gln Pro Lys Ser Ala Asp  
305 310 315 320

Pro Lys Ile Val Thr Lys Lys Met Gln Arg Met Tyr Thr Met Asp Glu  
325 330 335

Gln Ala Thr Leu Arg Leu Ser His Glu Asn Glu Glu Val Lys Gln Ile  
340 345 350

Tyr Lys Glu Phe Leu Ile Glu Pro Asn Gly His Leu Ser His Glu Leu

Leu His Thr His Tyr Asn Asp Arg Ser Lys Ala Ile Gln Asp Met Ser  
370 375 380

Leu His Glu Lys Lys  
385

<210> 32  
<211> 458  
<212> PRT  
<213> Desulfovibrio desulfuricans

<400> 32

Met Asn Gly Gln Gln Asn Val Ile Arg Ile Asp Ser Asp Ile Cys Thr  
1 5 10 15

Gly Cys Gly Arg Cys Lys Asp Val Cys Pro Val Gly Ala Val Glu Gly  
20 25 30

Val Gln Gly Thr Pro His Ser Ile Arg Glu Asp Val Cys Val Leu Cys  
35 40 45

Gly Gln Cys Val Gln Gln Cys Ser Ala Phe Ala Ser Phe Tyr Glu Gln  
50 55 60

His Pro Ala Cys Ile Ala Glu Lys Lys Arg Glu Arg Gly Leu Phe Val  
65 70 75 80

Ser Glu Ala Ala Pro Leu Phe Ala Ala Trp His Thr Gly Asp Ala Pro  
85 90 95

Arg Val Ala Gly Arg Leu Ala Glu Gly Cys His Ser Met Val Gln Cys  
100 105 110

Ala Pro Ala Val Arg Ala Ala Ile Gly Glu Glu Phe Gly Met Pro Ala  
115 120 125

Gly Ala Leu Thr Pro Gly Arg Leu Ala Ala Ala Leu Arg Arg Leu Gly  
130 135 140

Phe Asp Arg Val Tyr Asp Thr Asn Phe Ala Ala Asp Leu Thr Ile Met  
145 150 155 160

Glu Glu Gly Ser Glu Leu Leu Gln Arg Met Glu Gly Ala Gly Pro Leu  
165 170 175

Pro Met Phe Thr Ser Cys Cys Pro Ala Trp Val Arg Tyr Ala Glu Gln  
180 185 190

Gln Phe Pro Asp Leu Leu Glu His Leu Ser Ser Cys Lys Ser Pro Gln  
195 200 205

Gln Met Ala Gly Ala Val Phe Lys Ser Tyr Gly Ala Gln Leu Asp Gly  
 210 215 220  
 Val Asp Pro Arg Gln Val Phe Ser Val Ala Val Met Pro Cys Thr Cys  
 225 230 235 240  
 Lys Lys Ala Glu Ala Gln Arg Pro Gly Met Glu His Asp Gly Val Arg  
 245 250 255  
 Asp Val Asp Ala Val Leu Thr Thr Gly Glu Leu Ala Ala Met Leu Arg  
 260 265 270  
 Gln Ala His Ile Asp Phe Ala Ala Leu Pro Asp Glu Pro Phe Asp Arg  
 275 280 285  
 Pro Leu Gly Ser Tyr Ser Gly Ala Gly Asn Ile Phe Gly Leu Thr Gly  
 290 295 300  
 Gly Val Met Glu Ala Ala Leu Arg Thr Ala Tyr Glu Leu Val Thr Gly  
 305 310 315 320  
 Glu Pro Val Pro Cys Thr Glu Leu Val Tyr Val Arg Gly Gly Glu Gly  
 325 330 335  
 Ile Arg His Ala Thr Leu Thr Met Asp Gly Arg Thr Phe Arg Val Ala  
 340 345 350  
 Val Val Ala Gly Leu Gln His Val Arg Pro Leu Leu Glu Ala Val Arg  
 355 360 365  
 Ala Gly Thr Cys Asp Val Asn Phe Val Glu Val Met Cys Cys Pro Gln  
 370 375 380  
 Gly Cys Ile Ser Gly Gly Gly Gln Pro Lys Val Leu Leu Pro Phe Gln  
 385 390 395 400  
 Arg Asp Glu Val Tyr Ala Ala Arg Lys Ala Ala Leu Tyr Arg His Asp  
 405 410 415  
 Ala Glu Leu Ala Cys Arg Lys Ser His Glu Asn Pro Gln Val Gln Ala  
 420 425 430  
 Leu Tyr Arg Glu Phe Leu Gly Glu Pro Leu Ser His Val Ser His Asn  
 435 440 445  
 Leu Leu His Thr Val Tyr Gly Gln Thr Arg  
 450 455

<210> 33  
 <211> 554  
 <212> PRT  
 <213> Desulfitobacterium hafniense  
 <400> 33

061010 third listing.txt

Met Met Gln Leu Lys His Pro Phe Gln Ser Gly Phe Gln Gln Gln Ser  
1 5 10 15

Cys Lys Arg His Thr Lys Lys Val Val Val Asp Met Glu Ser Lys Ala  
20 25 30

Gly Lys Gly Ser Asn Leu Ser Arg Arg Ser Phe Leu Lys Phe Ala Gly  
35 40 45

Gly Ala Gly Ile Ala Gly Ala Ser Leu Ser Leu Thr Gly Cys Gly Gln  
50 55 60

Pro Leu Thr Pro Ala Ser Ala Val Gly Gly Glu Gly Trp Met Pro Thr  
65 70 75 80

Gln Tyr Asn Glu Pro Gly Gly Trp Pro Thr Asn Val Arg Gly Arg Val  
85 90 95

Pro Ile Asp Pro Glu Asn Pro Ala Leu Arg Arg Asp Asp Gln Lys Cys  
100 105 110

Ile Leu Cys Gly Gln Cys Ile Glu Val Cys Lys Thr Ile Gln Ser Val  
115 120 125

Tyr Gly Asn Tyr Glu Leu Pro Leu Lys Asn Glu Ile Pro Cys Ile Asn  
130 135 140

Cys Gly Gln Cys Ile His Trp Cys Pro Ser Gly Ala Ile Ser Glu Arg  
145 150 155 160

Glu Asp Ile Asp Gln Val Ala Lys Ala Leu Ala Asp Pro Lys Ile Thr  
165 170 175

Val Val Val Gln Thr Ala Pro Ala Thr Arg Ile Gly Leu Gly Glu Glu  
180 185 190

Phe Gly Leu Pro Val Gly Thr Asn Val Gln Gly Lys Gln Val Ala Ala  
195 200 205

Leu Arg Lys Leu Gly Phe Asp Val Ile Phe Asp Thr Asn Phe Ala Ala  
210 215 220

Asp Leu Thr Ile Met Glu Glu Gly Thr Glu Leu Val Lys Arg Ile Thr  
225 230 235 240

Gly Glu Leu His His Pro Leu Pro Gln Phe Thr Ser Cys Cys Pro Gly  
245 250 255

Trp Val Lys Phe Val Glu Tyr Tyr Tyr Pro Glu Leu Leu Pro Asn Leu  
260 265 270

Ser Ser Ala Lys Ser Pro Gln Gln Met Ala Gly Ala Leu Val Lys Thr

Tyr Phe Ala Glu Lys Asn His Val Glu Pro Gln Lys Ile Phe Ser Val  
290 295 300

Ala Ile Met Pro Cys Thr Ala Lys Lys Phe Glu Cys Gln Arg Pro Glu  
305 310 315 320

Met Ile Ser Ala Gln Thr Tyr Trp Gln Asp Glu Gln Val Ser Pro Asp  
325 330 335

Val Asp Val Val Leu Thr Thr Arg Glu Leu Ala Arg Met Ile Lys Arg  
340 345 350

Ala Gly Ile Asp Leu Pro Ser Leu Pro Asp Glu Glu Tyr Asp Gln Leu  
355 360 365

Met Gly Val Ala Thr Gly Ala Gly Ala Ile Phe Gly Thr Thr Gly Gly  
370 375 380

Val Met Glu Ala Ala Val Arg Ser Ala Tyr Tyr Leu Val Thr Gly Glu  
385 390 395 400

Gln Pro Pro Ala Ala Leu Trp Gln Leu Thr Pro Val Arg Gly Met Glu  
405 410 415

Gly Val Lys Glu Ala Ala Val Ser Ile Pro Gly Ala Gly Glu Ile Arg  
420 425 430

Ile Ala Val Ile Ser Gly Leu Asp Asn Ala Arg Ala Ile Met Glu Gln  
435 440 445

Val Lys Ala Gly Asn Ser Pro Trp Thr Phe Ile Glu Val Met Ala Cys  
450 455 460

Pro Gly Gly Cys Gln Tyr Gly Gly Gly Gln Pro Arg Ser Ser Ala Pro  
465 470 475 480

Pro Ser Asp Gly Val Arg Asn Thr Arg Ala Ala Ser Leu Tyr Lys Ile  
485 490 495

Asp Ala Gln Ala Lys Leu Arg Asn Ser His Asp Asn Pro Gln Ile Lys  
500 505 510

Gln Val Tyr Ala Glu Phe Leu Thr Ser Pro Leu Ser Glu Lys Ala Glu  
515 520 525

Glu Leu Leu His Thr His Tyr Ile Ser Arg Ala Glu Glu Phe Asp Ala  
530 535 540

Lys Lys Pro Gln Ser His Glu Tyr Glu Val  
545 550

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<210> 34  
 <211> 578  
 <212> PRT  
 <213> Eubacterium acidaminophilum

<400> 34

Met Val Asn Ile Thr Ile Asp Gly Arg Gln Val Thr Val Pro Ala Asn  
 1 5 10 15

Ser Thr Val Leu Asp Ala Ala Arg Asp Met Gly Ile Asn Ile Pro Thr  
 20 25 30

Leu Cys Tyr Leu Lys Asp Ile Asn Lys Thr Gly Ala Cys Arg Met Cys  
 35 40 45

Leu Val Glu Val Glu Gly Ile Arg Asn Leu Gln Thr Ala Cys Thr Phe  
 50 55 60

Pro Val Arg Asp Gly Leu Val Val Lys Thr Asn Thr Lys Arg Val Arg  
 65 70 75 80

Asp Ala Arg Arg Asp Asn Leu Gln Leu Ile Leu Ser Asn His His Arg  
 85 90 95

Asp Cys Leu Ser Cys Phe Arg Asn Gly Ser Cys Glu Leu Gln Ala Leu  
 100 105 110

Cys Asp Asp Met Gly Leu Ser Glu Leu Asp Phe Glu Ala Pro Lys Glu  
 115 120 125

Leu Lys Pro Val Asp Met Leu Ser His Ser Ile Val Arg Asp Pro Asn  
 130 135 140

Lys Cys Ile Leu Cys Gly Arg Cys Val Ala Val Cys Asn Lys Val Gln  
 145 150 155 160

Glu Val Gly Ile Leu Ala Phe Thr Asn Arg Gly Val Glu Thr Glu Val  
 165 170 175

Ala Pro Ala Phe Ala Thr Ser Met Ala Asp Ala Pro Cys Ile Tyr Cys  
 180 185 190

Gly Gln Cys Val Asn Val Cys Pro Val Ala Ala Leu Arg Glu Lys Thr  
 195 200 205

Asp Ile Glu Lys Val Trp Glu Val Leu Glu Asp Glu Thr Lys His Val  
 210 215 220

Val Val Gln Val Ala Pro Ala Val Arg Ala Ala Leu Gly Glu Met Phe  
 225 230 235 240

Gly Asn Pro Ile Gly Thr Arg Val Thr Gly Lys Met Phe Thr Ala Leu  
 245 250 255

Lys Met Leu Gly Phe Gln Lys Val Phe Asp Thr Asn Phe Ala Ala Asp  
 260 265 270  
 Leu Thr Ile Met Glu Glu Gly Thr Glu Leu Leu Gly Arg Ile Lys Asn  
 275 280 285  
 Gly Gly Thr Leu Pro Met Ile Thr Ser Cys Ser Pro Gly Trp Ile Arg  
 290 295 300  
 Tyr Val Glu His Phe Tyr Pro Glu Leu Leu Asp His Val Ser Ser Cys  
 305 310 315 320  
 Lys Ser Pro Gln Gln Met Met Gly Ala Val Leu Lys Ser Tyr Tyr Ala  
 325 330 335  
 Glu Lys Asn Asn Ile Ala Pro Glu Asn Met Ile Val Val Ser Val Met  
 340 345 350  
 Pro Cys Ile Ala Lys Lys Thr Glu Ser Ala Lys Glu Glu Met Lys Asn  
 355 360 365  
 Val His Gly Thr Arg Asp Val Asp Ile Val Leu Thr Thr Arg Glu Leu  
 370 375 380  
 Gly Lys Met Ile Lys Glu Ala Arg Ile Glu Phe Asn Asp Leu Gln Asp  
 385 390 395 400  
 Ser Asn Pro Asp Glu Phe Phe Gly Asp Tyr Thr Gly Ala Ala Val Ile  
 405 410 415  
 Phe Gly Ala Thr Gly Gly Val Met Glu Ala Ala Ile Arg Thr Val Ala  
 420 425 430  
 Asp Ile Val Ser Gly Gln Glu Leu Glu Asp Ile Glu Tyr Thr Ala Val  
 435 440 445  
 Arg Gly Leu Glu Gly Ile Lys Glu Ala Ala Val Lys Ile Gly Asp Leu  
 450 455 460  
 Glu Val Lys Val Ala Val Ala His Gly Thr Ala Asn Ala Gly Lys Leu  
 465 470 475 480  
 Met Asp Leu Val Arg Asp Gly Lys Ala Asp Tyr His Phe Ile Glu Ile  
 485 490 495  
 Met Gly Cys Ser Gly Gly Cys Val Thr Gly Gly Gly Gln Pro His Val  
 500 505 510  
 Asp Ser Arg Thr Lys Glu Lys Val Asn Val Lys Leu Glu Arg Ala Lys  
 515 520 525



Ala Leu Tyr Thr Glu Asp Lys Leu Arg Asp Lys Arg Lys Ser His His  
 530 535 540

Asn Glu Ser Val Lys Arg Leu Tyr Glu Glu Tyr Leu Gly Lys Pro Asn  
 545 550 555 560

Gly His Lys Ala His Glu Leu Leu His Thr His Tyr Lys Lys Arg Glu  
 565 570 575

Leu Phe

<210> 35  
 <211> 619  
 <212> PRT  
 <213> Rhodopseudomonas palustris  
 <400> 35

Met Cys Thr Pro Asp Gln Ala Ser Leu Ser Ala Arg Asp Pro Ala Glu  
 1 5 10 15

Ala Thr Ile Thr Leu Ser Ile Asn Gly Val Ala Cys Ala Gly Phe Ala  
 20 25 30

Asn Glu Thr Ile Leu Ser Cys Ala Arg Arg Tyr Asp Val Tyr Ile Pro  
 35 40 45

Thr Leu Cys Glu Leu Glu Asp Ile Asp His Thr Pro Gly Ala Cys Arg  
 50 55 60

Val Cys Leu Val Glu Ile Leu Gln Ala Gly Lys Asp Thr Pro Gln Ile  
 65 70 75 80

Val Thr Ala Cys Asn Thr Pro Val Arg Asp Gly Met Glu Val Gln Thr  
 85 90 95

Arg Ser Lys Lys Ala Arg Asp Met Gln Arg Leu Gln Val Glu Leu Leu  
 100 105 110

Met Ala Asp His Leu Gln Asp Cys Ala Thr Cys Ile Arg His Gly Ser  
 115 120 125

Cys Glu Leu Gln Asp Leu Ala Gln Phe Val Gly Leu Gln Gln Asn Arg  
 130 135 140

Phe Phe Asp Arg Glu Arg Thr Glu Ala Arg Pro Val Asp His Ser Ser  
 145 150 155 160

Pro Ser Met Val Arg Asp Met Arg Arg Cys Val Arg Cys Gln Arg Cys  
 165 170 175

Val Ala Ile Cys Arg Tyr His Gln Lys Ile Asp Ala Leu Ala Ile Glu  
 180 185 190

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Gly Ser Gly Leu Glu Arg Met Val Ala Leu Arg Asp Ala Asp Gly Tyr  
195 200 205

Pro Asn Ser Val Cys Val Ser Cys Gly Gln Cys Val Leu Val Cys Pro  
210 215 220

Thr Gly Ala Leu Gly Glu Arg Asp Glu Thr Asp Arg Ala Leu Asp Tyr  
225 230 235 240

Ile Cys Asp Pro Asn Val Val Thr Val Val Gln Phe Ala Pro Ala Val  
245 250 255

Arg Val Ala Phe Gly Glu Glu Phe Gly Leu Pro Ala Gly Thr Asn Val  
260 265 270

Glu Gly Gln Ile Ile Ala Ala Cys Arg Lys Leu Gly Val Asp Val Val  
275 280 285

Leu Asp Thr Asn Phe Ala Ala Asp Val Val Ile Met Glu Glu Gly Ala  
290 295 300

Glu Leu Leu Ala Arg Leu Lys Gln Gly Arg Arg Pro Thr Phe Thr Ser  
305 310 315 320

Cys Cys Pro Ala Trp Ile Asn Phe Ala Glu Ile His Tyr Pro Asp Val  
325 330 335

Leu Pro Leu Leu Ser Ser Thr Lys Ser Pro Gln Gln Val Leu Ser Thr  
340 345 350

Ile Ala Lys Ser Tyr Leu Pro Ala Gln Leu Gly Val Pro Ala Glu Arg  
355 360 365

Ile Arg Val Ile Ser Ile Met Pro Cys Ile Ala Lys Lys Asp Glu Ala  
370 375 380

Val Arg Pro Gln Met Val His Asp Gly Gln Pro Glu Thr Asp Leu Val  
385 390 395 400

Leu Thr Thr Arg Glu Phe Ala Arg Leu Leu Arg Arg Glu Gly Ile Asp  
405 410 415

Leu Lys Asp Leu Pro Ser Ser Gln Phe Asp Arg Pro Phe Leu Ser Ala  
420 425 430

Tyr Ser Gly Ala Gly Ala Ile Phe Gly Thr Thr Gly Gly Val Met Glu  
435 440 445

Ala Ala Val Arg Thr Ile Tyr Ala Leu Val Asn Gly Arg Glu Leu Glu  
450 455 460

Arg Ile Glu Leu Thr Gln Leu Arg Gly Phe Glu Gly Leu Arg Glu Ala

465                      470                      475                      480  
 Thr Val Asp Leu Gly Ala Pro Val Gly Glu Val Lys Val Ala Met Val  
                                  485                                   490                                   495  
 His Gly Leu Gly Asp Thr Arg Lys Leu Val Glu Ser Val Leu Ser Gly  
                                  500                                   505                                   510  
 Glu Ala Asn Tyr Asp Phe Ile Glu Val Met Ala Cys Pro Gly Gly Cys  
                                  515                                   520                                   525  
 Val Asp Gly Gly Gly Ser Leu Arg Ser Lys Lys Ala Tyr Leu Pro Leu  
                                  530                                   535                                   540  
 Ala Leu Lys Arg Arg Glu Thr Ile Tyr Asn Val Asp Arg Ala Ala Lys  
                                  545                                   550                                   555                                   560  
 Val Arg Gln Ser His Asn Asn Pro Gln Val Gln Ala Leu Tyr Arg Glu  
                                  565                                   570                                   575  
 Leu Leu Gln Ala Pro Asn Ser Glu Ile Ala His Arg Leu Leu His Thr  
                                  580                                   585                                   590  
 His Tyr Ala Ser Arg Lys Arg Glu Leu Gln His Thr Val Lys Glu Ile  
                                  595                                   600                                   605  
 Trp Asp Asp Leu Thr Met Ser Thr Ile Leu Tyr  
                                  610                                   615  
 <210> 36  
 <211> 644  
 <212> PRT  
 <213> Clostridium thermocellum  
 <400> 36  
 Met Asp Ser Phe Leu Met Lys Gly Tyr Ile Lys Glu Ala Asn Ile Asp  
 1                                   5                                   10                                   15  
 Tyr Ser Cys Ser Arg Gly Ser Met Glu Asp Leu Pro Lys Trp Glu Phe  
                                  20                                   25                                   30  
 Arg Glu Ile Pro Lys Val Pro Arg Ala Val Met Pro Ser Leu Ser Leu  
                                  35                                   40                                   45  
 Glu Glu Arg Lys Asn Asn Phe Asn Glu Val Glu Leu Gly Leu Ser Glu  
                                  50                                   55                                   60  
 Glu Val Ala Arg Lys Glu Ala Arg Arg Cys Leu Lys Cys Gly Cys Ser  
 65                                   70                                   75                                   80  
 Ala Arg Phe Thr Cys Asp Leu Arg Lys Glu Ala Ser Asn His Gly Ile  
                                  85                                   90                                   95

Val Tyr Glu Glu Pro Ile His Asp Arg Pro Tyr Ile Pro Lys Val Asp  
 100 105 110  
 Asp His Pro Phe Ile Val Arg Asp His Asn Lys Cys Ile Ser Cys Gly  
 115 120 125  
 Arg Cys Ile Ala Ala Cys Ala Glu Ile Glu Gly Pro Gly Val Leu Thr  
 130 135 140  
 Phe Tyr Met Lys Asn Gly Arg Gln Leu Val Gly Thr Lys Ser Gly Leu  
 145 150 155 160  
 Pro Leu Arg Asp Thr Asp Cys Val Ser Cys Gly Gln Cys Val Thr Ala  
 165 170 175  
 Cys Pro Cys Ala Ala Leu Asp Tyr Arg Arg Glu Arg Gly Lys Val Val  
 180 185 190  
 Arg Ala Ile Asn Asp Pro Lys Lys Thr Val Val Gly Phe Val Ala Pro  
 195 200 205  
 Ala Val Arg Ser Leu Ile Ser Asn Thr Phe Gly Val Ser Tyr Glu Glu  
 210 215 220  
 Ala Ser Pro Phe Met Ala Gly Leu Leu Lys Lys Leu Gly Phe Asp Lys  
 225 230 235 240  
 Val Phe Asp Phe Thr Phe Ala Ala Asp Leu Thr Ile Val Glu Glu Thr  
 245 250 255  
 Thr Glu Phe Leu Ser Arg Ile Gln Asn Lys Gly Val Met Pro Gln Phe  
 260 265 270  
 Thr Ser Cys Cys Pro Gly Trp Ile Asn Phe Val Glu Lys Arg Tyr Pro  
 275 280 285  
 Glu Ile Ile Pro His Leu Ser Thr Cys Lys Ser Pro Gln Met Met Met  
 290 295 300  
 Gly Ala Thr Val Lys Asn His Tyr Ala Lys Leu Met Gly Ile Asn Lys  
 305 310 315 320  
 Glu Asp Leu Phe Val Val Ser Ile Val Pro Cys Leu Ala Lys Lys Tyr  
 325 330 335  
 Glu Ala Ala Arg Pro Glu Phe Ile His Asp Gly Ile Arg Asp Val Asp  
 340 345 350  
 Ala Val Leu Thr Thr Thr Glu Met Leu Glu Met Met Glu Leu Ala Asp  
 355 360 365  
 Ile Lys Pro Ser Glu Val Val Pro Gln Glu Phe Asp Glu Pro Tyr Lys  
 370 375 380

Gln Val Ser Gly Ala Gly Ile Leu Phe Gly Ala Ser Gly Gly Val Ala  
 385 390 395 400  
 Glu Ala Ala Leu Arg Met Ala Val Glu Lys Leu Thr Gly Lys Val Leu  
 405 410 415  
 Thr Asp His Leu Glu Phe Glu Glu Ile Arg Gly Phe Glu Gly Val Lys  
 420 425 430  
 Glu Ser Thr Ile Asp Val Asn Gly Thr Lys Val Arg Val Ala Val Val  
 435 440 445  
 Ser Gly Leu Lys Asn Ala Glu Pro Ile Ile Glu Lys Ile Leu Asn Gly  
 450 455 460  
 Val Asp Val Gly Tyr Asp Leu Ile Glu Val Met Ala Cys Pro Gly Gly  
 465 470 475 480  
 Cys Ile Cys Gly Ala Gly His Pro Val Pro Glu Lys Ile Asp Ser Leu  
 485 490 495  
 Glu Lys Arg Gln Gln Val Leu Val Asn Ile Asp Lys Val Ser Lys Tyr  
 500 505 510  
 Arg Lys Ser Gln Glu Asn Pro Asp Ile Leu Arg Leu Tyr Asn Glu Phe  
 515 520 525  
 Tyr Gly Glu Pro Asn Ser Pro Leu Ala His Glu Leu Leu His Thr His  
 530 535 540  
 Tyr Thr Pro Lys His Gly Asp Ser Thr Cys Ser Pro Glu Arg Lys Lys  
 545 550 555 560  
 Gly Thr Ala Ala Phe Asp Val Gln Glu Phe Thr Ile Cys Met Cys Glu  
 565 570 575  
 Ser Cys Met Glu Lys Gly Ala Glu Asn Leu Tyr Asn Asp Leu Ser Ser  
 580 585 590  
 Lys Ile Arg Leu Phe Lys Met Asp Pro Phe Val Gln Ile Lys Arg Ile  
 595 600 605  
 Arg Leu Lys Glu Thr His Pro Gly Lys Gly Val Tyr Ile Ala Leu Asn  
 610 615 620  
 Gly Lys Gln Ile Glu Glu Pro Met Leu Ser Gly Asn Ile Pro Asp Glu  
 625 630 635 640  
 Ser Glu Ser Glu

<210> 37  
 <211> 572  
 <212> PRT  
 <213> Clostridium perfringens

<400> 37

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Met Asn Lys Ile Ile Ile Asn Asp Lys Thr Ile Glu Phe Asp Gly Asp
1      5      10      15

Lys Thr Ile Leu Asp Leu Ala Arg Glu Asn Gly Phe Asp Ile Pro Val
20      25      30

Leu Cys Glu Leu Lys Asn Cys Gly Asn Lys Gly Gln Cys Gly Val Cys
35      40      45

Leu Val Glu Gln Glu Gly Asn Asp Arg Leu Leu Arg Ser Cys Ala Ile
50      55      60

Lys Ala Lys Asp Gly Met Val Ile Lys Thr Asp Ser Glu Lys Val Leu
65      70      75      80

Glu Ala Arg Lys Glu Arg Val Ala Glu Leu Leu Asp Glu His Glu Phe
85      90      95

Lys Cys Gly Pro Cys Lys Arg Arg Glu Asn Cys Glu Phe Leu Lys Leu
100     105     110

Val Ile Lys Thr Lys Ala Arg Ala His Lys Pro Phe Val Val Ala Asp
115     120     125

Lys Ser Glu Tyr Val Asp Asp Arg Ser Lys Ser Ile Val Leu Asp Arg
130     135     140

Ser Lys Cys Val Lys Cys Gly Arg Cys Val Ala Ala Cys Arg Thr Arg
145     150     155     160

Thr Ala Thr Asn Ser Ile Lys Phe His Arg Ile Asp Gly Val Arg Leu
165     170     175

Val Gly Pro Glu Glu Leu Lys Cys Phe Asp Asp Thr Asn Cys Leu Leu
180     185     190

Cys Gly Gln Cys Ile Ala Ala Cys Pro Val Asp Ala Leu Ser Glu Lys
195     200     205

Ser His Ile Glu Arg Val Gln Glu Ala Leu Asn Asp Pro Glu Lys His
210     215     220

Val Ile Val Ala Met Ala Pro Ala Val Arg Thr Ser Met Gly Glu Leu
225     230     235     240

Phe Lys Met Gly Tyr Gly Gln Asp Val Thr Gly Lys Leu Tyr Thr Ala
245     250     255

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Leu Arg Glu Leu Gly Phe Asp Lys Val Phe Asp Ile Asn Phe Gly Ala  
 260 265 270  
 Asp Met Thr Ile Met Glu Glu Ala Thr Glu Leu Ile Glu Arg Ile Lys  
 275 280 285  
 Asn Asn Gly Pro Phe Pro Met Leu Thr Ser Cys Cys Pro Ser Trp Val  
 290 295 300  
 Arg Glu Val Glu Asn Tyr Phe Pro Glu Leu Val Glu Asn Leu Ser Ser  
 305 310 315 320  
 Ala Lys Ser Pro Gln Gln Ile Phe Gly Ala Ala Ser Lys Thr Tyr Tyr  
 325 330 335  
 Pro Gln Val Ala Asp Ile Asp Pro Lys Lys Val Phe Thr Val Thr Val  
 340 345 350  
 Met Pro Cys Thr Ser Lys Lys Phe Glu Ala Asp Arg Pro Glu Met Glu  
 355 360 365  
 Asn Glu Gly Ile Arg Asn Ile Asp Ala Val Ile Thr Thr Arg Glu Leu  
 370 375 380  
 Ala Arg Met Ile Lys Ala Ala Lys Ile Asp Phe Ala Lys Leu Glu Asp  
 385 390 395 400  
 Gly Glu Val Asp Pro Ala Met Gly Glu Tyr Thr Gly Ala Gly Val Ile  
 405 410 415  
 Phe Gly Ala Thr Gly Gly Val Met Glu Ala Ala Leu Arg Thr Ala Lys  
 420 425 430  
 Asp Phe Met Glu Asn Asp Asn Leu Asp Asn Val Asp Tyr Glu Ala Val  
 435 440 445  
 Arg Gly Leu Ala Gly Ile Lys Glu Ala Glu Val Glu Ile Ala Gly Asn  
 450 455 460  
 Glu Tyr Lys Leu Ala Val Val Ser Gly Ala Ala Asn Val Phe Glu Leu  
 465 470 475 480  
 Val Lys Ser Gly Lys Ile Asn Asp Tyr His Phe Ile Glu Val Met Ala  
 485 490 495  
 Cys Pro Gly Gly Cys Val Asn Gly Gly Gly Gln Pro His Ile Ser Ala  
 500 505 510  
 Glu Asp Ser Asp Lys Met Asp Ile Arg Glu Val Arg Ala Ser Val Leu  
 515 520 525  
 Tyr Asn Gln Asp Lys Asn Leu Glu Lys Arg Lys Ser His Gln Asn Ser

530

535

540

Ala Leu Leu Lys Met Tyr Glu Ser Tyr Met Gly Lys Pro Gly His Gly  
 545 550 555 560

Arg Ala His Glu Leu Leu His Met Lys Tyr Lys Lys  
 565 570

&lt;210&gt; 38

&lt;211&gt; 583

&lt;212&gt; PRT

&lt;213&gt; Clostridium thermocellum

&lt;400&gt; 38

Met His Val Leu Lys Leu Val His Ser Thr Gln Tyr Trp Arg Ala Glu  
 1 5 10 15

Glu Met Asp Asn Arg Glu Tyr Met Leu Ile Asp Gly Ile Pro Val Glu  
 20 25 30

Ile Asn Gly Glu Lys Asn Leu Leu Glu Leu Ile Arg Lys Ala Gly Ile  
 35 40 45

Lys Leu Pro Thr Phe Cys Tyr His Ser Glu Leu Ser Val Tyr Gly Ala  
 50 55 60

Cys Arg Met Cys Met Val Glu Asn Glu Trp Gly Gly Leu Asp Ala Ala  
 65 70 75 80

Cys Ser Thr Pro Pro Arg Ala Gly Met Ser Ile Lys Thr Asn Thr Glu  
 85 90 95

Arg Leu Gln Lys Tyr Arg Lys Met Ile Leu Glu Leu Leu Leu Ala Asn  
 100 105 110

His Cys Arg Asp Cys Thr Thr Cys Asn Asn Asn Gly Lys Cys Lys Leu  
 115 120 125

Gln Asp Leu Ala Met Arg Tyr Asn Ile Ser His Ile Arg Phe Pro Asn  
 130 135 140

Thr Ala Ser Asn Pro Asp Val Asp Asp Ser Ser Leu Cys Ile Thr Arg  
 145 150 155 160

Asp Arg Ser Lys Cys Ile Leu Cys Gly Asp Cys Val Arg Val Cys Asn  
 165 170 175

Glu Val Gln Asn Val Gly Ala Ile Asp Phe Ala Tyr Arg Gly Ser Lys  
 180 185 190

Met Thr Ile Ser Thr Val Phe Asp Lys Pro Ile Phe Glu Ser Asn Cys  
 195 200 205



Val Gly Cys Gly Gln Cys Ala Leu Ala Cys Pro Thr Gly Ala Ile Val  
 210 215 220  
 Val Lys Asp Asp Thr Gln Lys Val Trp Lys Glu Ile Tyr Asp Lys Asn  
 225 230 235 240  
 Thr Arg Val Ser Val Gln Ile Ala Pro Ala Val Arg Val Ala Leu Gly  
 245 250 255  
 Lys Glu Leu Gly Leu Asn Asp Gly Glu Asn Ala Ile Gly Lys Ile Val  
 260 265 270  
 Ala Ala Leu Arg Arg Met Gly Phe Asp Asp Ile Phe Asp Thr Ser Thr  
 275 280 285  
 Gly Ala Asp Leu Thr Val Leu Glu Glu Ser Ala Glu Leu Leu Arg Arg  
 290 295 300  
 Ile Arg Glu Gly Lys Asn Asp Met Pro Leu Phe Thr Ser Cys Cys Pro  
 305 310 315 320  
 Ala Trp Val Asn Tyr Cys Glu Lys Phe Tyr Pro Glu Leu Leu Pro His  
 325 330 335  
 Val Ser Thr Cys Arg Ser Pro Met Gln Met Phe Ala Ser Ile Ile Lys  
 340 345 350  
 Glu Glu Tyr Ser Thr Ser Ser Lys Arg Leu Val His Val Ala Val Met  
 355 360 365  
 Pro Cys Thr Ala Lys Lys Phe Glu Ala Ala Arg Lys Glu Phe Lys Val  
 370 375 380  
 Asn Gly Val Pro Asn Val Asp Tyr Val Leu Thr Thr Gln Glu Leu Val  
 385 390 395 400  
 Arg Met Ile Lys Glu Ser Gly Ile Val Phe Ser Glu Leu Glu Pro Glu  
 405 410 415  
 Ala Ile Asp Met Pro Phe Gly Thr Tyr Thr Gly Ala Gly Val Ile Phe  
 420 425 430  
 Gly Val Ser Gly Gly Val Thr Glu Ala Val Leu Arg Arg Val Val Ser  
 435 440 445  
 Asp Lys Ser Pro Thr Ser Phe Arg Ser Leu Ala Tyr Thr Gly Val Arg  
 450 455 460  
 Gly Met Asn Gly Val Lys Glu Ala Ser Val Met Tyr Gly Asp Arg Lys  
 465 470 475 480  
 Leu Lys Val Ala Val Val Ser Gly Leu Lys Asn Ala Gly Asp Leu Ile  
 485 490 495

Glu Arg Ile Lys Ala Gly Glu His Tyr Asp Leu Val Glu Val Met Ala  
500 505 510

Cys Pro Gly Gly Cys Ile Asn Gly Gly Gly Gln Pro Phe Val Gln Ser  
515 520 525

Glu Glu Arg Glu Lys Arg Gly Lys Gly Leu Tyr Ser Ala Asp Lys Leu  
530 535 540

Cys Asn Ile Lys Ser Ser Glu Glu Asn Pro Leu Met Met Thr Leu Tyr  
545 550 555 560

Lys Gly Ile Leu Lys Gly Arg Val His Glu Leu Leu His Val Asp Tyr  
565 570 575

Ala Ser Lys Lys Glu Ala Lys  
580

<210> 39  
<211> 439  
<212> PRT  
<213> Desulfovibrio desulfuricans

<400> 39

Met Ala Gly Cys Lys Ala Gln His Pro Pro Ala Ala Tyr Leu Ala Gly  
1 5 10 15

Leu Glu Val Pro Ala Ala Gly Ser Glu Val Thr Met Glu Gly Val Arg  
20 25 30

Tyr Lys Met Asn Ala Pro Lys Asp Val Asp Pro Ala Thr Ile Arg Phe  
35 40 45

Val Glu Val Asp His Asp Lys Cys Met Ala Cys Gly Glu Cys Glu Tyr  
50 55 60

His Cys Pro Thr Gly Val Met Gln Glu Val Thr Glu Asp Gly Tyr Arg  
65 70 75 80

Gly Val Val Asp Pro Val Ala Cys Val Asn Cys Gly Gln Cys Leu Ala  
85 90 95

Asn Cys Pro Phe Gly Ala Ile His Glu Glu Val Ser Phe Val Gly Glu  
100 105 110

Leu Tyr Glu Lys Leu Lys Asp Pro Asp Thr Val Val Val Ser Met Pro  
115 120 125

Ala Pro Ala Val Arg Tyr Ala Leu Gly Glu Cys Phe Gly Leu Pro Thr  
130 135 140

Gly Thr Tyr Val Gly Gly Gln Met His Ala Ala Leu Arg Arg Leu Gly

145                      150                      155                      160  
 Phe Asn Leu Val Trp Asp Thr Glu Trp Thr Ala Asp Val Thr Ile Met  
                                  165                                   170                                   175  
 Glu Glu Gly Thr Glu Leu Leu Glu Arg Val Lys His Gly Asn Met Pro  
                                  180                                   185                                   190  
 Leu Pro Gln Phe Thr Ser Cys Cys Pro Gly Trp Ile Lys Phe Ala Glu  
                                  195                                   200                                   205  
 Thr Phe Tyr Pro Asp Leu Glu Lys His Leu Ser Thr Cys Lys Ser Pro  
                                  210                                   215                                   220  
 Ile Ala Met Ile Gly Pro Leu Ala Lys Thr Tyr Gly Ala Gln Glu Ala  
                                  225                                   230                                   235                                   240  
 Gly Val Pro Ala Lys Lys Met Tyr Thr Val Ser Ile Met Pro Cys Ile  
                                  245                                   250                                   255  
 Ala Lys Lys Phe Glu Gly Met Arg Pro Glu Met Asn Ala Ser Gly Tyr  
                                  260                                   265                                   270  
 Arg Asp Ile Asp Ala Thr Ile Thr Thr Arg Glu Leu Ala Trp Met Ile  
                                  275                                   280                                   285  
 Lys Lys Ala Gly Ile Asp Phe Thr Ser Leu Pro Ser Glu Glu Pro Asp  
                                  290                                   295                                   300  
 Pro Ala Leu Gly Met Ser Thr Gly Ala Ala Thr Ile Phe Cys Thr Ser  
                                  305                                   310                                   315                                   320  
 Gly Gly Val Met Glu Ala Ala Leu Arg Leu Ala Tyr Glu Ala Leu Ser  
                                  325                                   330                                   335  
 Gly Gly Thr Leu Ala Asp Pro Asp Ile Lys Val Val Arg Thr His Glu  
                                  340                                   345                                   350  
 Gly Ile Asn Thr Ala Glu Val Pro Val Pro Asn Phe Gly Thr Val Lys  
                                  355                                   360                                   365  
 Val Ala Val Ala Ser Gly Leu Asp Asn Ala Ala Lys Leu Cys Glu Glu  
                                  370                                   375                                   380  
 Val Arg Ala Gly Lys Ser Pro Tyr His Phe Ile Glu Val Met Thr Cys  
                                  385                                   390                                   395                                   400  
 Pro Gly Gly Cys Val Asn Gly Gly Gly Gln Pro Leu Glu Pro Gly Met  
                                  405                                   410                                   415  
 Leu Gln Ser Ser Leu Phe Lys Ser Thr Ile Thr Lys Ile Asn Arg Arg  
                                  420                                   425                                   430

Phe Thr Arg Arg Ser Val Ala  
435

<210> 40  
<211> 379  
<212> PRT  
<213> Desulfovibrio desulfuricans  
  
<400> 40

Met Asn Leu Val Glu Met Glu Lys Ile Gln Tyr Val Asp Gln Ser Pro  
1 5 10 15

Asp Pro Arg Ala Asn Pro Asp Glu Leu Phe Phe Ile Gln Ile Asp Pro  
20 25 30

Glu Lys Cys Ile Gly Cys Asp Thr Cys Gln Glu Tyr Cys Pro Thr Gly  
35 40 45

Ala Ile Phe Gly Asp Thr Gly Ser Ala His Ser Ile Pro His Glu Glu  
50 55 60

Ile Cys Ile Asn Cys Gly Gln Cys Leu Thr His Cys Pro Val Gly Ala  
65 70 75 80

Ile Tyr Glu Val Gln Ser Trp Val Arg Glu Leu Ser Glu Lys Ile Lys  
85 90 95

Asp Pro Glu Ile Lys Val Ile Ala Met Pro Ala Pro Ala Val Arg Tyr  
100 105 110

Gly Leu Gly Glu Cys Phe Gly Met Pro Val Gly Thr Val Thr Thr Gly  
115 120 125

Lys Met Leu Thr Ala Leu Gln Met Leu Gly Phe Asp His Val Trp Asp  
130 135 140

Asn Glu Phe Thr Ala Asp Val Thr Ile Trp Glu Glu Gly Thr Glu Phe  
145 150 155 160

Val Lys Arg Leu Thr Gly Gln Ile Asp Lys Pro Leu Pro Gln Phe Thr  
165 170 175

Ser Cys Cys Pro Gly Trp His Lys Tyr Val Glu Ser Phe Tyr Pro Glu  
180 185 190

Leu Phe Pro His Leu Ser Ser Cys Lys Ser Pro Ile Gly Met Met Gly  
195 200 205

Ala Leu Ala Lys Thr Tyr Gly Pro Asp Val Met Lys Tyr Asp Arg Ser  
210 215 220

Lys Val Tyr Thr Val Ser Ile Met Pro Cys Thr Ala Lys Lys Tyr Glu  
225 230 235 240

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Gly Met Arg Ala Asp Leu Trp Ser Ser Gly Tyr Lys Asp Ile Asp Ala  
245 250 255

Thr Ile Asp Thr Arg Glu Leu Ala Tyr Met Ile Lys Lys Ala Gly Ile  
260 265 270

Asp Phe Ala Ala Leu Pro Asp Gly Lys Arg Asp Thr Leu Met Gly Asp  
275 280 285

Ser Thr Gly Gly Ala Thr Ile Phe Gly Val Ser Gly Gly Val Met Glu  
290 295 300

Ala Ala Leu Arg Tyr Ala Tyr Glu Ala Val Thr Gly Lys Lys Pro Ser  
305 310 315 320

Ser Trp Asp Phe Thr Met Val Arg Gly Leu Asn Gly Ile Lys Glu Gly  
325 330 335

Thr Val Thr Ile Gly Asp Ala Lys Ile Asn Val Ala Val Val His Gly  
340 345 350

Ala Lys Arg Phe Ala Glu Val Cys Glu Val Ile Lys Thr Gly Lys Ser  
355 360 365

Pro Cys Ile Ser Ser Ser Leu Cys Leu Pro Arg  
370 375

<210> 41  
<211> 421  
<212> PRT  
<213> Desulfovibrio desulfuricans

<400> 41

Met Asn Leu Val Glu Met Glu Lys Ile Gln Tyr Val Asp Gln Ser Pro  
1 5 10 15

Asp Pro Arg Ala Asn Pro Asp Glu Leu Phe Phe Ile Gln Ile Asp Pro  
20 25 30

Glu Lys Cys Ile Gly Cys Asp Thr Cys Gln Glu Tyr Cys Pro Thr Gly  
35 40 45

Ala Ile Phe Gly Asp Thr Gly Ser Ala His Ser Ile Pro His Glu Glu  
50 55 60

Ile Cys Ile Asn Cys Gly Gln Cys Leu Thr His Cys Pro Val Gly Ala  
65 70 75 80

Ile Tyr Glu Val Gln Ser Trp Val Arg Glu Leu Ser Glu Lys Ile Lys  
85 90 95

Asp Pro Glu Ile Lys Val Ile Ala Met Pro Ala Pro Ala Val Arg Tyr

Gly Leu Gly Glu Cys Phe Gly Met Pro Val Gly Thr Val Thr Thr Gly  
 115 120 125  
 Lys Met Leu Thr Ala Leu Gln Met Leu Gly Phe Asp His Val Trp Asp  
 130 135 140  
 Asn Glu Phe Thr Ala Asp Val Thr Ile Trp Glu Glu Gly Thr Glu Phe  
 145 150 155 160  
 Val Lys Arg Leu Thr Gly Gln Ile Asp Lys Pro Leu Pro Gln Phe Thr  
 165 170 175  
 Ser Cys Cys Pro Gly Trp His Lys Tyr Val Glu Ser Phe Tyr Pro Glu  
 180 185 190  
 Leu Phe Pro His Leu Ser Ser Cys Lys Ser Pro Ile Gly Met Met Gly  
 195 200 205  
 Ala Leu Ala Lys Thr Tyr Gly Pro Asp Val Met Lys Tyr Asp Arg Ser  
 210 215 220  
 Lys Val Tyr Thr Val Ser Ile Met Pro Cys Thr Ala Lys Lys Tyr Glu  
 225 230 235 240  
 Gly Met Arg Ala Asp Leu Trp Ser Ser Gly Tyr Lys Asp Ile Asp Ala  
 245 250 255  
 Thr Ile Asp Thr Arg Glu Leu Ala Tyr Met Ile Lys Lys Ala Gly Ile  
 260 265 270  
 Asp Phe Ala Ala Leu Pro Asp Gly Lys Arg Asp Thr Leu Met Gly Asp  
 275 280 285  
 Ser Thr Gly Gly Ala Thr Ile Phe Gly Val Ser Gly Gly Val Met Glu  
 290 295 300  
 Ala Ala Leu Arg Tyr Ala Tyr Glu Ala Val Thr Gly Lys Lys Pro Ser  
 305 310 315 320  
 Ser Trp Asp Phe Thr Met Val Arg Gly Leu Asn Gly Ile Lys Glu Gly  
 325 330 335  
 Thr Val Thr Ile Gly Asp Ala Lys Ile Asn Val Ala Val Val His Gly  
 340 345 350  
 Ala Lys Arg Phe Ala Glu Val Cys Glu Val Ile Lys Thr Gly Lys Ser  
 355 360 365  
 Pro Trp His Phe Ile Glu Phe Met Ala Cys Pro Gly Gly Cys Val Cys  
 370 375 380

061010 third listing.txt

Gly Gly Gly Gln Pro Val Met Pro Gly Val Leu Glu Ala Met Asp Arg  
385 390 395 400

Lys Val Ser Arg Thr Phe Ala Gly Leu Lys Glu Arg Leu Asn Arg Met  
405 410 415

Ser Ser Ser Lys Ala  
420

<210> 42  
<211> 369  
<212> PRT  
<213> Trichomonas vaginalis

<400> 42

Cys Asp Gly Lys Trp Leu Ser Pro Ala Cys Val Thr Thr Val Trp Asp  
1 5 10 15

Gly Leu Lys Ile Asp Thr Lys Ser Lys Asn Val Arg Asp Ser Val Glu  
20 25 30

Asn Asn Leu Lys Glu Leu Leu Asp Cys His Asp Glu Thr Cys Ser Ala  
35 40 45

Cys Ile Ala Asn His Arg Cys Gln Phe Arg Asp Met Asn Val Ala Tyr  
50 55 60

Ser Val Lys Ala Glu Thr Lys Glu Ile Cys Ser Glu Glu Gly Ile Asp  
65 70 75 80

Glu Ser Thr Asn Ala Ile Arg Leu Asp Thr Ser Lys Cys Val Leu Cys  
85 90 95

Gly Arg Cys Ile Arg Ala Cys Glu Glu Val Ala Gly Thr Ser Ala Ile  
100 105 110

Ile Phe Gly Asn Arg Ala Lys Lys Met Arg Ile Gln Pro Thr Phe Gly  
115 120 125

Val Thr Leu Gln Glu Thr Ser Cys Ile Lys Cys Gly Gln Cys Thr Leu  
130 135 140

Tyr Cys Pro Val Gly Ala Ile Thr Glu Lys Ser Gln Val Lys Glu Ala  
145 150 155 160

Leu Asp Ile Leu Ala Asn Lys Gly Lys Lys Ile Thr Val Val Gln Val  
165 170 175

Ala Pro Ala Val Arg Val Ala Leu Ser Glu Ala Phe Gly Tyr Lys Glu  
180 185 190

Gly Thr Val Thr Thr Gly Lys Met Val Ser Ala Leu Lys Ala Leu Gly  
195 200 205

061010 third listing.txt

Phe Asp Leu Val Tyr Asp Thr Asn Tyr Gly Ala Asp Leu Thr Ile Cys  
210 215 220

Glu Glu Ala Gly Glu Leu Val Asn Arg Leu Arg Asp Pro Asn Ala Lys  
225 230 235 240

Phe Pro Met Phe Thr Ser Cys Cys Pro Ala Trp Val Asn Tyr Val Glu  
245 250 255

Gln Ser Ala Pro Asp Phe Ile Pro Asn Leu Ser Ser Cys Arg Ser Pro  
260 265 270

Gln Gly Met Leu Ser Ala Leu Ile Lys Asn Tyr Leu Pro Lys Leu Leu  
275 280 285

Asp Val Lys Gln Glu Asp Val Leu Asn Phe Ser Ile Met Pro Cys Thr  
290 295 300

Ala Lys Lys Asp Glu Val Glu Arg Pro Glu Leu Arg Thr Lys Ser Gly  
305 310 315 320

Pro Lys Glu Thr Asp Met Val Leu Thr Val Arg Glu Leu Val Glu Met  
325 330 335

Ile Lys Leu Ser Asn Ile Asp Phe Asn Asn Leu Pro Asp Thr Gln Phe  
340 345 350

Asp Asn Ile Phe Gly Phe Gly Ser Gly Ala Gly Gln Ile Phe Ala Ala  
355 360 365

Thr

<210> 43  
<211> 369  
<212> PRT  
<213> Trichomonas gallinae

<400> 43

Cys Asp Gly Lys Trp Leu Ser Pro Ala Cys Val Thr Thr Val Trp Asp  
1 5 10 15

Gly Leu Arg Ile Asp Thr Lys Ser Lys Val Val Arg Asp Ser Val Glu  
20 25 30

Asn Asn Leu Lys Glu Leu Leu Asp Cys His Asp Glu Thr Cys Ser Ser  
35 40 45

Cys Val Ala Asn His Arg Cys Gln Phe Arg Asp Met Asn Val Ala Tyr  
50 55 60

Ser Val Lys Ala Asp Thr Lys Glu Ile Cys Ser Glu Glu Gly Ile Asp



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65              70              75              80
Glu Ser Thr His Ala Ile Arg Leu Asp Thr Ser Lys Cys Val Leu Cys
      85              90              95
Gly Arg Cys Ile Arg Ala Cys Glu Glu Val Ala Gly Thr Ser Ala Ile
      100             105             110
Ile Phe Gly Asn Arg Ala Lys His Met Arg Ile Gln Pro Thr Phe Gly
      115             120             125
Gly Thr Leu Gln Glu Thr Ala Cys Ile Lys Cys Gly Gln Cys Thr Leu
      130             135             140
Tyr Cys Pro Val Gly Ala Ile Thr Glu Lys Ser Gln Val Lys Glu Ala
      145             150             155             160
Leu Asp Ile Leu Ala Asn Lys Gly Lys Lys Val Thr Val Val Gln Val
      165             170             175
Ala Pro Ala Val Arg Val Ala Leu Ser Glu Ala Phe Gly Tyr Lys Glu
      180             185             190
Gly Thr Val Thr Thr Gly Lys Met Val Ser Ala Leu Lys Ala Leu Gly
      195             200             205
Phe Asp Leu Val Tyr Asp Thr Asn Tyr Gly Ala Asp Leu Thr Ile Cys
      210             215             220
Glu Glu Ala Gly Glu Leu Val Asn Arg Leu Lys Asp Pro Lys Ala Val
      225             230             235             240
Phe Pro Met Phe Thr Ser Cys Cys Pro Ala Trp Val Asn Tyr Val Glu
      245             250             255
Gln Ser Ala Pro Asp Phe Ile Pro Asn Leu Ser Ser Cys Arg Ser Pro
      260             265             270
Gln Gly Met Leu Ser Ser Leu Ile Lys Asn Tyr Leu Pro Lys Leu Leu
      275             280             285
Gly Ile Lys Gln Glu Glu Val Met Asn Phe Ser Ile Met Pro Cys Thr
      290             295             300
Ala Lys Lys Asp Glu Ile Glu Arg Pro Glu Leu Gln Thr Lys Thr Gly
      305             310             315             320
Leu Lys Glu Thr Asp Met Val Leu Thr Val Arg Glu Leu Val Glu Met
      325             330             335
Ile Lys Leu Ser Asn Ile Asp Phe Asn Asn Leu Pro Asp Thr Pro Phe
      340             345             350

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Asp Asn Ile Phe Gly Phe Gly Ser Gly Ala Gly Gln Ile Phe Ala Ala  
 355 360 365

Thr

<210> 44  
 <211> 456  
 <212> PRT  
 <213> Nyctotherus ovalis  
 <400> 44

Met Ile Ser Arg Leu Ile Ala Lys Lys Ala Pro Leu Phe Leu Arg Thr  
 1 5 10 15

Phe Ala Thr Ser Glu Met Ile Ser Leu Lys Ile Asp Gly Lys Ile Ile  
 20 25 30

Ser Val Pro Lys Gly Ile Met Leu Ala Asp Ala Ile Lys Lys Ala Gly  
 35 40 45

Ala Asn Val Pro Thr Met Cys Tyr His Pro Asp Leu Pro Thr Ser Gly  
 50 55 60

Gly Ile Cys Arg Val Cys Leu Val Glu Ser Ala Lys Ser Pro Gly Tyr  
 65 70 75 80

Pro Ile Ile Ser Cys Arg Thr Pro Val Glu Glu Gly Met Glu Ile Val  
 85 90 95

Thr Gln Gly Ser Lys Met Lys Glu Tyr Arg Gln Ala Asn Leu Ala Leu  
 100 105 110

Met Leu Ser Arg His Pro Asn Ala Cys Leu Ser Cys Thr Ser Asn Thr  
 115 120 125

Asn Cys Lys Thr Gln Glu Leu Ser Ala Asn Met Asn Ile Gly Gln Cys  
 130 135 140

Gly Phe Ala Asn Ala Thr Pro Pro Lys Asn Asp Asp Ser Tyr Asp Met  
 145 150 155 160

Thr Thr Ala Ile Glu Arg Asp Asn Asp Lys Cys Ile Asn Cys Asp Ile  
 165 170 175

Cys Val His Thr Cys Ser Leu Gln Gly Leu Asn Ala Leu Gly Phe Tyr  
 180 185 190

Asn Glu Glu Gly His Ala Val Lys Ser Met Gly Thr Leu Asp Val Ser  
 195 200 205

Glu Cys Ile Gln Cys Gly Gln Cys Ile Asn Arg Cys Pro Thr Gly Ala  
 210 215 220

Ile Thr Glu Lys Ser Glu Ile Arg Pro Val Leu Asp Ala Ile Asn Ile  
225 230 235 240

Gln Gln Arg Leu Val Phe Gln Met Ala Pro Ser Ile Arg Val Ala Val  
245 250 255

Ala Glu Glu Phe Gly Ile Lys Pro Gly Glu Lys Ile Leu Lys Asn Glu  
260 265 270

Ile Ala Thr Ala Leu Arg Lys Leu Gly Ser Asn Val Phe Val Leu Asp  
275 280 285

Thr Asn Phe Ser Ala Asp Leu Thr Ile Ile Glu Glu Gly His Glu Leu  
290 295 300

Ile Glu Arg Leu Tyr Arg Asn Val Thr Gly Lys Lys Leu Leu Gly Gly  
305 310 315 320

Asp His Met Pro Ile Asp Leu Pro Met Leu Thr Ser Cys Cys Pro Gly  
325 330 335

Trp Ile Met Phe Ile Glu Lys Asn Tyr Pro Asp Leu Leu Asn Asn Leu  
340 345 350

Ser Thr Cys Lys Ser Pro Gln Gly Met Leu Gly Ala Leu Ile Lys Gly  
355 360 365

Tyr Trp Ala Lys Asn Ile Lys Lys Met Asp Pro Lys Asp Ile Val Ser  
370 375 380

Val Ser Ile Met Pro Cys Thr Ala Lys Lys Ala Glu Lys Glu Arg Pro  
385 390 395 400

Gln Leu Arg Gly Asp Glu Gly Tyr Lys Asp Val Asp Tyr Ile Leu Thr  
405 410 415

Thr Arg Glu Leu Ala Lys Met Leu Lys Gln Ser Asn Ile Asp Leu Ala  
420 425 430

Lys Met Glu Pro Thr Pro Phe Asp Lys Val Met Ser Glu Gly Thr Gly  
435 440 445

Ala Ala Val Ile Phe Gly Val Thr  
450 455

<210> 45

<211> 369

<212> PRT

<213> Trichomonas vaginalis

<400> 45

Cys Asp Gly Lys Trp Leu Ala Pro Ala Cys Val Thr Thr Val Trp Asp

Gly	Leu	Lys	Ile 20	Asp	Thr	Lys	Ser	Lys 25	Met	Val	Lys	Glu	Ser 30	Val	Glu
Asn	Asn	Leu 35	Lys	Glu	Leu	Leu	Asp 40	Cys	His	Asp	Glu	Thr 45	Cys	Ser	Ser
Cys	Val 50	Ala	Asn	His	Arg	Cys 55	Gln	Phe	Arg	Asp	Met 60	Asn	Val	Ala	Tyr
Ser 65	Ile	Lys	Ala	Glu	Thr 70	Lys	Glu	Glu	Cys	Ser 75	Glu	Glu	Gly	Ile	Asp 80
Glu	Ser	Thr	Asn	Ser 85	Ile	Arg	Leu	Asp	Thr 90	Ser	Lys	Cys	Val	Leu 95	Cys
Gly	Arg	Cys	Ile 100	Arg	Ala	Cys	Glu	Glu 105	Val	Ala	Gly	Gln	Ser 110	Ala	Ile
Ile	Phe	Gly 115	Asn	Arg	Ala	Lys	His 120	Met	Arg	Ile	Gln	Pro 125	Thr	Phe	Gly
Gln	Thr 130	Leu	Gln	Asp	Thr	Ser 135	Cys	Ile	Lys	Cys	Gly 140	Gln	Cys	Thr	Leu
Tyr 145	Cys	Pro	Val	Gly	Ala 150	Ile	Thr	Glu	Lys	Ser 155	Gln	Val	Lys	Gln	Ala 160
Leu	Asp	Ile	Leu	Ser 165	Asn	Lys	Gly	Lys	Lys 170	Ile	Ser	Val	Ile	Gln 175	Val
Ala	Pro	Ala	Val 180	Arg	Val	Ala	Leu	Ser 185	Glu	Ala	Phe	Gly	Tyr 190	Lys	Glu
Gly	Ser	Val 195	Thr	Thr	Gly	Lys	Met 200	Val	Ser	Ala	Leu	Lys 205	Ala	Leu	Gly
Phe	Asp 210	Tyr	Val	Tyr	Asp	Thr 215	Asn	Tyr	Ser	Ala	Asp 220	Leu	Thr	Ile	Val
Glu 225	Glu	Ala	Gly	Glu	Leu 230	Val	Gln	Arg	Leu	Lys 235	Asn	Pro	Asn	Ala	Val 240
Phe	Pro	Met	Phe	Thr 245	Ser	Cys	Cys	Pro	Ala 250	Trp	Val	Asn	Tyr	Val 255	Glu
Gln	Ser	Ala	Pro 260	Asp	Phe	Ile	Pro	Asn 265	Leu	Ser	Ser	Cys	Arg 270	Ser	Pro
Gln	Gly	Met 275	Leu	Ser	Ser	Leu	Val 280	Lys	Asn	Tyr	Leu	Pro 285	Lys	Val	Leu

061010 third listing.txt

Asn Ile Pro Val Glu Asp Val Leu Asn Phe Ser Ile Met Pro Cys Thr  
 290 295 300  
 Ala Lys Lys Asp Glu Ile Glu Arg Pro Glu Leu Arg Thr Lys Asp Gly  
 305 310 315 320  
 His Lys Glu Thr Asp Met Val Leu Thr Val Arg Glu Leu Val Glu Met  
 325 330 335  
 Ile Lys Leu Ser Gly Ile Asp Phe Asn Asn Leu Pro Asp Thr Pro Phe  
 340 345 350  
 Asp Ser Ile Phe Gly Phe Gly Ser Gly Ala Gly Gln Ile Phe Ala Ala  
 355 360 365  
 Thr  
 <210> 46  
 <211> 464  
 <212> PRT  
 <213> Entamoeba histolytica  
 <400> 46  
 Arg Leu His Thr Val Thr Gly His Asp His Asn His Ser Ile Gln Phe  
 1 5 10 15  
 Asp Trp Ser Lys Cys Met Gly Cys Gly Met Cys Ala Thr Lys Cys Thr  
 20 25 30  
 Phe Gly Val Leu Val Lys Gln Pro Pro Lys Ile Pro Pro Phe Val Gln  
 35 40 45  
 Pro Asn Arg Glu Lys Leu Ser Gln Glu Asn Thr Asp Lys Thr Arg Val  
 50 55 60  
 Leu Ile Asp Glu Ser Glu Cys Thr Gly Cys Gly Gln Cys Ser Leu Val  
 65 70 75 80  
 Cys Asn Phe Gly Ser Ile Thr Pro Ile Asp His Leu Val Asp Thr Phe  
 85 90 95  
 Lys Ala Lys Glu Ala Gly Lys Lys Leu Val Ala Met Ile Ala Pro Ser  
 100 105 110  
 Thr Arg Leu Gly Val Ala Glu Ala Met Gly Met Pro Ile Gly Ser Thr  
 115 120 125  
 Ala Met Ala Gln Leu Val His Cys Leu Arg Leu Ile Gly Phe Asp Tyr  
 130 135 140  
 Val Phe Asp Val Asp Ala Gly Ala Asp Lys Thr Thr Met Asp Asp Tyr  
 145 150 155 160

Ala Glu Val Ile Glu Met Lys Lys Glu Gly Lys Gly Pro Ala Ile Thr  
 165 170 175  
 Ser Cys Cys Pro Ala Trp Ile Glu Leu Val Glu Lys Glu Tyr Pro Asp  
 180 185 190  
 Leu Ile Pro Asn Val Ser Thr Ala Arg Ser Pro Ile Gly Cys Leu Ala  
 195 200 205  
 Gly Cys Ile Lys Arg Gly Trp Ala Lys Asp Val Gly Ile Ala Val Glu  
 210 215 220  
 Asp Leu Tyr Thr Val Gly Ile Met Pro Cys Ile Ala Lys Lys Thr Glu  
 225 230 235 240  
 Ser Gln Arg Gln Gln Ile His Gln Asp Tyr Asp Ala Ser Cys Thr Ser  
 245 250 255  
 Asn Glu Ile Ala Ala Tyr Phe Lys Lys His Leu Pro Pro Glu Glu Cys  
 260 265 270  
 Lys Phe Thr Gln Glu Arg Glu Glu Ala Leu Ala Lys Thr Glu Asp Gly  
 275 280 285  
 Gln Cys Asp Leu Pro Phe Arg Arg Ile Ser Gly Gly Ser Asn Ile Phe  
 290 295 300  
 Gly Arg Thr Gly Gly Val Cys Glu Thr Val Leu Arg Val Ile Ala Arg  
 305 310 315 320  
 Asn Ala Gly Val Asp Trp Asn Ser Cys Thr Val Asn Lys Glu Glu Thr  
 325 330 335  
 Phe Lys His Ala Ala Ser Gly Ser Thr Met Thr Asn Leu Ser Val Asp  
 340 345 350  
 Ile Gly Gly Thr Ile Ile Thr Gly Ala Val Cys His Gly Gly Tyr Ala  
 355 360 365  
 Ile Arg His Ala Cys Glu Leu Ile Arg Lys Gly Glu Leu Lys Val Asp  
 370 375 380  
 Val Val Glu Met Met Ala Cys Val Gly Gly Cys Leu Gly Gly Ala Gly  
 385 390 395 400  
 Gln Pro Lys Ile Pro Pro Ala Lys Lys Leu Glu Met Asp Lys Arg Arg  
 405 410 415  
 Val Met Leu Asp Ile Leu Asp Gln Gln Thr Asp Ile Arg Ala Ala Asn  
 420 425 430

Glu Asn Thr Asp Val Leu Gly Trp Ile Asp Lys His Phe Asp His Gln  
 435 440 445

Gly Ala His Gln His Leu His Thr Tyr Phe Thr Pro Arg Tyr Gln Asn  
 450 455 460

<210> 47  
 <211> 474  
 <212> PRT  
 <213> Giardia intestinalis  
 <400> 47

Met Pro Pro Lys Pro Gln His Asp Val Thr Gly Val Asp Ser Asn Asn  
 1 5 10 15

Ala Ile Met Ile Asp Tyr Ala Lys Cys Ile Gly Cys Asn Met Cys Ile  
 20 25 30

Lys Ala Cys Asp Val Gln Gly Ile Gly Val Tyr Lys Gln Asn Glu Lys  
 35 40 45

Pro Lys Tyr Pro Pro Ile Val Lys Leu Ser Thr Leu Phe Asn Ser Asp  
 50 55 60

Cys Ile Gly Cys Gly Gln Cys Ala Thr Ile Cys Pro Val Asp Ala Ile  
 65 70 75 80

Ala Pro Lys Asn Asn Leu Glu Ile Tyr Lys Gly Glu Ser Ala Ser Lys  
 85 90 95

Lys Val Arg Val Ala Leu Ile Ala Pro Ser Thr Arg Val Ala Phe Gly  
 100 105 110

Asp Val Phe Gly Leu Pro Ile Gly Thr Asn Thr Ile Tyr Ser Leu Ile  
 115 120 125

Arg Met Leu Lys Gln Tyr Leu Gly Phe Asp Tyr Val Phe Asp Val Asn  
 130 135 140

Phe Gly Ala Asp Glu Thr Thr Val Ile Asp Thr Gln Glu Leu Leu His  
 145 150 155 160

Phe Lys His Glu Gly Arg Gly Pro Val Phe Thr Ser Cys Cys Pro Ala  
 165 170 175

Trp Val Asn Leu Cys Glu Met Lys Tyr Pro Glu Leu Leu Pro Gln Val  
 180 185 190

Ser Thr Ala Lys Ser Cys Val Ala Met Val Ala Thr Leu Val Lys Arg  
 195 200 205

Arg Trp Val Gln Glu His Leu Ile Pro Lys Gly Ile Val Asp Ser Val  
 210 215 220

061010 third listing.txt

Asp Asp Val Tyr Val Ala Asp Ile Met Pro Cys Thr Ala Lys Lys Asp  
225 230 235 240

Glu Ser Met Arg Pro Gln Leu Asn Arg Asp Val Asp Ile Cys Leu Thr  
245 250 255

Val Arg Glu Val Ala Glu His Leu Tyr Phe Leu His Gly Ala Arg Leu  
260 265 270

Thr Leu Glu Glu Val Glu Ala Asp Ala Leu Val Leu Arg Pro Gly Arg  
275 280 285

Ser Thr Gln Lys Lys Trp Asp Phe Asp Ala Pro Phe Asn Thr Val Ser  
290 295 300

Gly Gly Ser His Ile Phe Gly Lys Thr Gly Gly Val Ala Glu Thr Cys  
305 310 315 320

Leu Arg Phe Ile Ser Tyr Met Lys Lys Ser Pro Ile Glu Asn Val Lys  
325 330 335

Glu Glu Leu Leu Lys Glu Phe Lys Thr Pro Gly Gln Leu Val Gln Thr  
340 345 350

Val Lys Leu Val Ser Cys Glu Ile Ala Gly Glu Thr Tyr Arg Ala Leu  
355 360 365

Ile Ala His Gly Gly Ser Ala Ile Asn Ala Ala Ala Arg Met Val Leu  
370 375 380

Asn Lys Glu Val Glu Cys Asp Val Val Glu Gln Met Ala Cys Pro Gly  
385 390 395 400

Gly Cys Gln Asn Gly Gly Gly Met Pro Lys Ile Lys Gly Lys Lys Glu  
405 410 415

Ala Val Leu Thr Arg Ala Ser Thr Leu Asp Ile Leu Asp Gly Lys Glu  
420 425 430

Arg Phe Ala Ser Ala Gly Glu Asn Lys Thr Leu Trp Gly Phe Asn Gly  
435 440 445

Cys Leu Thr Glu His Glu Ala His Glu Leu Leu His Thr His Tyr Gln  
450 455 460

His Arg Pro Val Glu Ser Leu Leu Pro Gln  
465 470

<210> 48  
<211> 844  
<212> PRT  
<213> Desulfitobacterium hafniense



&lt;400&gt; 48

Met Val Lys Ile Ile Ser Ile Thr Asn Asn Ala Lys Arg Gln Gly Lys  
1 5 10 15

Gly Thr Ser Arg Lys Glu Lys Gln Ala Met Lys Glu Val Thr Lys Gln  
20 25 30

Gln Arg Ile Arg Val Thr Val Asn Gly Arg Gln Met Glu Val Tyr Gly  
35 40 45

Asp Leu Thr Ile Leu Gln Ala Leu Leu Gln Glu Asp Ile His Ile Pro  
50 55 60

His Leu Cys Tyr Asp Ile Arg Leu Glu Arg Ser Asn Gly Asn Cys Gly  
65 70 75 80

Leu Cys Val Val Glu Leu Gly Glu Gly Ser Glu Gln Gln Asp Val Lys  
85 90 95

Ala Cys His Thr Pro Ile Gln Glu Gly Met Ile Ile His Thr Asn Ser  
100 105 110

Pro Arg Leu Glu His Tyr Arg Lys Ile Arg Leu Glu Gln Ile Leu Ala  
115 120 125

Asp His Asn Ala Asp Cys Val Ala Pro Cys Val Met Thr Cys Pro Ala  
130 135 140

Asn Ile Asp Ile Gln Ser Tyr Leu Ser His Ala Gly Asn Gly Asn Phe  
145 150 155 160

Glu Thr Ala Ile Lys Val Ile Lys Glu Arg Asn Pro Phe Pro Ile Val  
165 170 175

Cys Gly Arg Val Cys Pro His Ser Cys Glu Ala Gln Cys Arg Arg Asn  
180 185 190

Leu Ile Asp Glu Pro Val Ala Ile Asn His Val Lys Arg Phe Ile Ala  
195 200 205

Asp Trp Asp Ile Ala His Glu Gln Pro Trp Ala Pro Arg Lys Lys Ala  
210 215 220

Ala Thr Gly Lys Lys Ile Ala Val Val Gly Ala Gly Ser Ser Gly Leu  
225 230 235 240

Ser Ala Ala Tyr Tyr Ser Ala Ile Gln Gly His Asp Val Thr Val Phe  
245 250 255

Glu Arg His Pro Arg Ala Gly Gly Met Met Arg Tyr Gly Ile Pro Glu  
260 265 270

Tyr Arg Leu Pro Lys Glu Thr Leu Asp Arg Glu Ile Gly Leu Ile Ala  
 275 280 285

Asp Leu Gly Val Lys Ile Met Thr Asn Lys Ala Leu Gly Thr His Ile  
 290 295 300

Arg Leu Glu Asp Leu His Gln Asp Phe Asp Ala Val Tyr Leu Ala Ile  
 305 310 315 320

Gly Ser Trp Arg Ala Thr Pro Leu Gln Ile Glu Gly Asp Asn Leu Glu  
 325 330 335

Gly Val Trp Leu Gly Ile Asn Phe Leu Glu Gln Val Thr Lys Gly Ala  
 340 345 350

Asp Ile Lys Leu Gly Glu His Val Val Val Ile Gly Gly Gly Asn Thr  
 355 360 365

Ala Ile Asp Cys Ala Arg Thr Ala Leu Arg Lys Gly Ala Gly Ser Val  
 370 375 380

Lys Leu Val Tyr Arg Arg Thr Arg Glu Glu Met Pro Ala Glu Ser Tyr  
 385 390 395 400

Glu Val Glu Glu Ala Ile His Glu Gly Val Glu Met Tyr Phe Leu Thr  
 405 410 415

Ala Pro His Lys Ile Val Ala Glu Gly Gly Arg Lys Leu Leu His Cys  
 420 425 430

Ile Lys Met Thr Leu Gly Glu Pro Asp Arg Ser Gly Arg Arg Arg Pro  
 435 440 445

Ile Pro Ile Glu Gly Ser Glu Thr Ala Phe Glu Ala Asp Thr Ile Ile  
 450 455 460

Gly Ala Ile Gly Gln Ser Thr Asn Thr Gln Phe Leu Tyr His Asp Leu  
 465 470 475 480

Pro Val Lys Leu Asn Lys Trp Gly Asp Ile Glu Ile Asn Gly Lys Thr  
 485 490 495

Met Gln Thr Ser Glu Met Asn Ile Phe Ala Gly Gly Asp Cys Val Thr  
 500 505 510

Gly Pro Ala Thr Val Ile Gln Ala Val Ala Ala Gly Arg His Ala Ala  
 515 520 525

Glu Ala Met Asp Ser Phe Leu Met Lys Gly Tyr Val Lys Glu Gln Pro  
 530 535 540

Met Asp Tyr Ser Cys Ser Arg Gly Ser Leu Glu Asp Leu Pro Gln Trp  
 545 550 555 560

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Glu Phe Glu Lys Ile Pro Arg Leu Lys Arg Ala Pro Met Pro Ala Leu  
 565 570 575  
 Pro Pro Ala Glu Arg Arg Asp Asn Phe Arg Glu Val Glu Thr Gly Leu  
 580 585 590  
 Ser Glu Glu Thr Ala Arg Ala Glu Ala Arg Arg Cys Leu Lys Cys Gly  
 595 600 605  
 Cys Tyr Glu Arg Tyr Asp Cys Asp Leu Arg Gln Glu Ala Ser Leu His  
 610 615 620  
 His Val Glu Phe Lys Lys Pro Val His Glu Arg Pro Tyr Ile Pro Ile  
 625 630 635 640  
 Val Glu Asp His Ser Ile Ile Ile Arg Asp His Asn Lys Cys Ile Ser  
 645 650 655  
 Cys Gly Arg Cys Ile Ala Ala Cys Ala Glu Val Glu Gly Pro Asp Ile  
 660 665 670  
 Leu Ser Phe Tyr Met Lys His Gly Arg Gln Leu Val Gly Thr Lys Ser  
 675 680 685  
 Gly Leu Pro Leu Asp Gln Thr Asp Cys Val Ser Cys Gly Gln Cys Val  
 690 695 700  
 Asn Ala Cys Pro Cys Gly Ala Leu Asp Tyr Arg Ser Glu Ile Gly Arg  
 705 710 715 720  
 Val Phe Arg Ala Ile Asn Asp Pro Gly Lys Thr Thr Val Ala Phe Val  
 725 730 735  
 Ala Pro Ala Val Arg Ser Val Val Ser Ser Gln Tyr Gly Val Ser Tyr  
 740 745 750  
 Gln Glu Ala Ser Arg Phe Ile Ala Gly Leu Leu Lys Lys Ile Gly Phe  
 755 760 765  
 Asp Lys Val Phe Asp Phe Thr Phe Ala Ala Asp Leu Thr Ile Val Glu  
 770 775 780  
 Glu Thr Thr Glu Phe Leu Thr Arg Leu Gln Ser His Lys Pro Ile Pro  
 785 790 795 800  
 Gln Phe Thr Ser Cys Cys Pro Gly Trp Val Asn Phe Val Glu Arg Arg  
 805 810 815  
 Tyr Pro Glu Ile Ile Pro Tyr Leu Ser Ser Cys Lys Ser Pro Gln Met  
 820 825 830

061010 third listing.txt  
 Met Met Gly Ala Thr Val Lys Ile Thr Leu Arg Asn  
 835 840

<210> 49  
 <211> 119  
 <212> PRT  
 <213> Nyctotherus velox

<400> 49

Ile Leu Phe Met Glu Lys Asn Tyr Pro Asp Met Leu Asn His Leu Ser  
 1 5 10 15

Thr Cys Lys Ser Pro Gln Gly Met Leu Gly Ala Leu Ile Lys Gly Tyr  
 20 25 30

Trp Ala Lys Asn Val Lys Lys Ile Asp Pro Lys Asp Val Val Ser Val  
 35 40 45

Ser Ile Met Pro Cys Thr Ala Lys Lys Glu Glu Lys Asp Arg Ile Thr  
 50 55 60

Leu Lys Ser Asp Glu Gly Tyr Asn Asn Val Asp Tyr Val Leu Thr Thr  
 65 70 75 80

Arg Glu Leu Ala Lys Met Phe Lys Gln Ser Asn Ile Asp Pro Ser Lys  
 85 90 95

Leu Pro Pro Thr Gln Phe Asp Asn Val Met Ser Glu Gly Thr Gly Ala  
 100 105 110

Ala Val Ile Phe Gly Val Thr  
 115

<210> 50  
 <211> 476  
 <212> PRT  
 <213> Oryza sativa

<400> 50

Met Ala Ser Ser Ser Ser Ala Ser Ser Arg Phe Ser Pro Ala Leu  
 1 5 10 15

Gln Ala Ser Asp Leu Asn Asp Phe Ile Ala Pro Ser Gln Asp Cys Ile  
 20 25 30

Ile Ser Leu Asn Lys Gly Pro Ser Ala Arg Arg Leu Pro Ile Lys Gln  
 35 40 45

Lys Glu Ile Ala Val Ser Thr Asn Pro Pro Glu Glu Ala Val Lys Ile  
 50 55 60

Ser Leu Lys Asp Cys Leu Ala Cys Ser Gly Cys Ile Thr Ser Ala Glu  
 65 70 75 80

Thr Val Met Leu Glu Lys Gln Ser Leu Gly Asp Phe Ile Thr Arg Ile  
 85 90 95  
 Asn Ser Asp Lys Ala Val Ile Val Ser Val Ser Pro Gln Ser Arg Ala  
 100 105 110  
 Ser Leu Ala Ala Phe Phe Gly Leu Ser Gln Ser Gln Val Phe Arg Lys  
 115 120 125  
 Leu Thr Ala Leu Phe Lys Ser Met Gly Val Lys Ala Val Tyr Asp Thr  
 130 135 140  
 Ser Ser Ser Arg Asp Leu Ser Leu Ile Glu Ala Cys Ser Glu Phe Val  
 145 150 155 160  
 Thr Arg Tyr His Gln Asn Gln Leu Ser Ser Gly Lys Glu Ala Gly Lys  
 165 170 175  
 Asn Leu Pro Met Leu Ser Ser Ala Cys Pro Gly Trp Ile Cys Tyr Ala  
 180 185 190  
 Glu Lys Thr Leu Gly Ser Phe Ile Leu Pro Tyr Ile Ser Ala Val Lys  
 195 200 205  
 Ser Pro Gln Gln Ala Ile Gly Ala Ala Ile Lys His His Met Val Gly  
 210 215 220  
 Lys Leu Gly Leu Lys Pro His Asp Val Tyr His Val Thr Val Met Pro  
 225 230 235 240  
 Cys Tyr Asp Lys Lys Leu Glu Ala Val Arg Asp Asp Phe Val Phe Ser  
 245 250 255  
 Val Glu Asp Lys Asp Val Thr Glu Val Asp Ser Val Leu Thr Thr Gly  
 260 265 270  
 Glu Val Leu Asp Leu Ile Gln Ser Arg Ser Val Asp Phe Lys Thr Leu  
 275 280 285  
 Glu Glu Ser Pro Met Asp Arg Leu Leu Thr Asn Val Asp Asp Asp Gly  
 290 295 300  
 Gln Leu Tyr Gly Val Ser Gly Gly Ser Gly Gly Tyr Ala Glu Thr Val  
 305 310 315 320  
 Phe Arg His Ala Ala His Val Leu Phe Asp Arg Lys Ile Glu Gly Ser  
 325 330 335  
 Val Asp Phe Arg Ile Leu Arg Asn Ser Asp Phe Arg Glu Val Thr Leu  
 340 345 350  
 Glu Val Glu Gly Lys Pro Val Leu Lys Phe Ala Leu Cys Tyr Gly Phe  
 355 360 365

061010 third listing.txt

Arg Asn Leu Gln Asn Ile Ile Arg Lys Ile Lys Met Gly Lys Cys Glu  
370 375 380

Tyr His Phe Ile Glu Val Met Ala Cys Pro Ser Gly Cys Leu Asn Gly  
385 390 395 400

Gly Gly Gln Ile Lys Pro Ala Lys Gly Gln Ser Ala Lys Asp Leu Ile  
405 410 415

Gln Leu Leu Glu Asp Val Tyr Ile Gln Asp Val Ser Val Ser Asn Pro  
420 425 430

Phe Glu Asn Pro Ile Ala Lys Arg Leu Tyr Asp Glu Trp Leu Gly Gln  
435 440 445

Pro Gly Ser Glu Asn Ala Lys Lys Tyr Leu His Thr Lys Tyr His Pro  
450 455 460

Val Val Lys Ser Val Ala Ser Gln Leu Gln Asn Trp  
465 470 475

<210> 51  
<211> 114  
<212> PRT  
<213> Psalteriomonas lanterna

<400> 51

Ile Asn Leu Val Glu Lys His Tyr Pro Glu Tyr Leu Pro Asn Leu Ser  
1 5 10 15

Ser Cys Arg Ser Pro Gln Gly Met Leu Ser Ser Leu Ile Lys Asn Tyr  
20 25 30

Trp Ala Lys Lys Met Gly Ile Glu Pro Lys Asp Val Val Val Val Ser  
35 40 45

Phe Met Pro Cys Gly Ala Lys Lys Asp Glu Ile Lys Arg Pro Gln Leu  
50 55 60

Lys Gly Glu Thr Asp Tyr Val Leu Thr Thr Arg Glu Leu Gly Lys Leu  
65 70 75 80

Phe Lys Met Gly Gly Leu Asn Asp Leu Ser Val Leu Glu Pro Val Lys  
85 90 95

Tyr Asp Asp Pro Leu Gly Glu Ser Thr Gly Ala Ala Val Ile Phe Gly  
100 105 110

Ala Thr

<210> 52

<211> 119  
 <212> PRT  
 <213> Nyctotherus ovalis

<400> 52

Ile Met Phe Met Glu Lys Asn Tyr Pro Asp Met Leu Asn His Leu Ser  
 1 5 10 15

Thr Cys Lys Ser Pro Gln Gly Met Leu Gly Ala Leu Ile Lys Gly Tyr  
 20 25 30

Trp Ala Lys Asn Ile Lys Lys Met Asp Pro Lys Asp Ile Val Ser Val  
 35 40 45

Ser Ile Met Pro Cys Thr Ala Lys Lys Ala Glu Lys Glu Arg Pro Gln  
 50 55 60

Leu Arg Gly Asp Glu Gly Tyr Lys Asp Val Asp Tyr Ile Leu Thr Thr  
 65 70 75 80

Arg Glu Leu Ala Lys Met Leu Lys Gln Ser Asn Ile Asp Leu Gly Lys  
 85 90 95

Met Glu Pro Thr Pro Phe Asp Lys Val Met Ser Glu Gly Thr Gly Ala  
 100 105 110

Ala Val Ile Phe Gly Val Thr  
 115

<210> 53  
 <211> 119  
 <212> PRT  
 <213> Nyctotherus ovalis

<400> 53

Ile Met Phe Met Glu Lys Asn Tyr Pro Asp Met Leu Asn His Leu Ser  
 1 5 10 15

Thr Cys Lys Ser Pro Gln Gly Met Leu Gly Ala Leu Ile Lys Gly Tyr  
 20 25 30

Trp Ala Lys Asn Val Lys Lys Met Asp Pro Lys Asp Ile Val Ser Val  
 35 40 45

Ser Ile Met Pro Cys Thr Ala Lys Lys Ala Glu Lys Glu Arg Pro Gln  
 50 55 60

Leu Arg Gly Asp Glu Gly Tyr Lys Asp Val Asp Tyr Ile Leu Thr Thr  
 65 70 75 80

Arg Glu Leu Ala Lys Met Leu Lys Gln Ser Asn Ile Asp Leu Gly Lys  
 85 90 95

Met Glu Pro Arg Pro Phe Asp Lys Val Met Ser Glu Gly Thr Gly Ala

Ala Val Ile Phe Gly Val Thr  
115

<210> 54  
<211> 520  
<212> PRT  
<213> Rhodospirillum rubrum

<400> 54

Met Arg Pro Val Gln Arg Pro Arg Arg Trp Pro Gly Leu Arg Gln Arg  
1 5 10 15

Leu Ser Pro Glu Arg Pro Val Asp Arg Arg Ser Arg Arg Arg Ser Gly  
20 25 30

Ala Ala Arg Pro Gly Arg Arg Arg Gly Ser Gly Val Gln His Glu Ile  
35 40 45

Leu Arg Ser Val Ser Gln Arg Asp Met Ser Met Ser Ile Gln Pro Thr  
50 55 60

Val Thr Ile Asp Pro Glu Leu Cys Thr Gly Cys Gly Arg Cys Val Glu  
65 70 75 80

Thr Cys Pro Val Gln Ala Ile Ala Gly Ser Arg Gly Lys Ala His Glu  
85 90 95

Ile Glu Ala Ala Ala Cys Val Ser Cys Gly Arg Cys Val Ala Thr Cys  
100 105 110

Ala Ala Phe Asp Ser Ile Phe Asp Ala Phe Pro Thr Pro Arg Pro Val  
115 120 125

Arg Leu Lys Arg Arg Gly Leu Pro Gly Ser Leu Lys Glu Pro Leu Phe  
130 135 140

Ala Ala His Asp Pro Ser Arg Ile Glu Ala Val Arg Lys Ala Phe Ala  
145 150 155 160

Thr Pro Lys Arg Met Thr Val Met Gln Val Asp Thr Met Ala Cys Val  
165 170 175

Ala Leu Ala Glu Asp Phe Gly Leu Pro Pro Gly Ser Leu Ser Pro Leu  
180 185 190

Lys Ile Ala Ser Ala Ala Arg Gln Leu Gly Phe Asp Arg Val Tyr Arg  
195 200 205

Thr Ser Phe Pro Ala Gly Leu Ala Val Leu Glu Thr Ala His Glu Met  
210 215 220



Ala Ala Arg Leu Ala Asn Gly Gly Asn Leu Pro Val Ile Asn Ser Ser  
 225 230 235 240  
 Cys Pro Ala Val Val Ala Phe Leu Glu Arg Arg Tyr Pro Glu Leu Leu  
 245 250 255  
 His Tyr Leu Ser Thr Val Lys Ser Pro His Gln Ile Ala Gly Ala Leu  
 260 265 270  
 Tyr Asn Ser Tyr Leu Ala Asp Ala Ala Asn Leu Ala Pro Ala Asn Ile  
 275 280 285  
 His Lys Val Ser Val Val Ala Cys Leu Ser His Lys Ala Glu Ala Glu  
 290 295 300  
 Arg Pro Glu Met Met Thr Cys Gly Cys Pro Asp Ile Asp Thr Val Leu  
 305 310 315 320  
 Thr Ala Arg Glu Leu Ala Ile Leu Ile Lys Asp Ala Gly Ile Asp Val  
 325 330 335  
 Pro Leu Leu Gly Asp Gly Glu Phe Asp Asn Asp Phe Pro Glu Ile Glu  
 340 345 350  
 Gly Leu Asp Thr Leu Tyr Cys Ala Pro Gly Asp Val Ser Arg Ala Val  
 355 360 365  
 Leu Gly Ala Gly Arg Trp Phe Leu Gly Gln Gly Glu Gly Val Gly Ala  
 370 375 380  
 Pro Ala Gly Glu Thr Val Glu Val Leu Asp Glu Ala Thr Arg Leu Thr  
 385 390 395 400  
 Arg Leu Ala Tyr Pro Gly Gly Thr Leu Gln Ala Leu Thr Val Ala Gly  
 405 410 415  
 Phe Asp Lys Ala Val Pro Tyr Leu Glu Ala Ile Lys Ala Gly Arg Asn  
 420 425 430  
 Ala Phe Gln Phe Leu Glu Ile Ala Ser Cys Pro Gln Gly Cys Ala Ser  
 435 440 445  
 Gly Ala Gly Leu Pro Lys Val Leu Leu Glu Thr Glu Lys Pro Ala Arg  
 450 455 460  
 Tyr Arg Ala Arg Ile Glu Asn Leu Pro Pro Ala Ala Pro Glu Ala Trp  
 465 470 475 480  
 Ser Arg Leu Pro Gly His Pro Ser Ile Val Ala Leu Tyr Gly Gly Tyr  
 485 490 495  
 Phe Gly Lys Ala Ile Gly Asp Lys Ser Asn Arg Arg Leu His Thr Gln  
 500 505 510

Tyr Ala Glu Pro Ala Ala Ala Pro  
 515 520

<210> 55  
 <211> 240  
 <212> PRT  
 <213> Desulfitobacterium hafniense

<400> 55

Met Ala Val Glu Lys Leu Thr Gly Glu Val Leu Thr Asp Gln Leu Asp  
 1 5 10 15

Tyr Gln Glu Val Arg Gly Leu Gln Gly Ile Lys Glu Ala Ala Val Glu  
 20 25 30

Ala Lys Gly Lys Lys Val Asn Val Ala Val Ile Ser Gly Leu His Asn  
 35 40 45

Val Glu Pro Ile Leu Glu Lys Ile Ile Glu Gly Met Glu Val Gly Tyr  
 50 55 60

Asp Leu Ile Glu Val Met Ala Cys Pro Gly Gly Cys Ile Cys Gly Ala  
 65 70 75 80

Gly His Pro Val Pro Glu Lys Ile Asp Thr Leu Glu Lys Arg Gln Gln  
 85 90 95

Val Leu Val Asn Ile Asp Gln Thr Ser Arg Tyr Arg Lys Ser Gln Glu  
 100 105 110

Asn Pro Asp Ile Leu Arg Leu Tyr Asp Glu Tyr Tyr Gly Glu Ala Asn  
 115 120 125

Ser Pro Leu Ala His Lys Leu Leu His Thr His Tyr Glu Ala Val Lys  
 130 135 140

Arg Glu Pro Val Ala Lys His Asp Arg Arg Met Ala Asp Ser Ala Phe  
 145 150 155 160

Val Thr His Glu Leu Thr Leu Cys Thr Cys Asp Lys Cys Thr Ala Gln  
 165 170 175

Gly Ser Arg Glu Leu Phe Ala Ala Leu Ser Gly Lys Ile Arg Lys Leu  
 180 185 190

Lys Met Asp Ser Phe Val Thr Ala Arg Thr Ile Arg Leu Lys Glu Asn  
 195 200 205

His Pro Gly Gln Gly Val Tyr Ala Ala Ile Asp Gly Lys Leu Ile Glu  
 210 215 220

Thr Pro Val Glu Gln Leu Glu Gln Arg Ile Phe Gln His Leu Ile Arg

225

230

235

240

<210> 56  
 <211> 86  
 <212> PRT  
 <213> Desulfitobacterium hafniense

<400> 56

Met Val Ser Ile Val Pro Cys Ile Ala Lys Lys Tyr Glu Ala Ala Arg  
 1 5 10 15

Pro Glu Phe Arg Ser Glu Gly Ile Arg Asp Val Asp Ala Val Leu Thr  
 20 25 30

Ser Thr Glu Met Leu Glu Met Ala Asp Ile Lys Leu Ile Glu Pro Ala  
 35 40 45

Asp Val Glu Pro Gln Asp Phe Cys Glu Pro Tyr Lys Arg Val Ser Gly  
 50 55 60

Ala Gly Ile Leu Phe Gly Ala Ser Gly Gly Val Ala Lys Arg Pro Cys  
 65 70 75 80

Gly Trp Arg Trp Arg Asn  
 85

<210> 57  
 <211> 477  
 <212> PRT  
 <213> Drosophila melanogaster

<400> 57

Met Ser Arg Leu Ser Arg Ala Leu Gln Leu Thr Asp Ile Asp Asp Phe  
 1 5 10 15

Ile Thr Pro Ser Gln Ile Cys Ile Lys Pro Val Gln Ile Asp Lys Ala  
 20 25 30

Arg Ser Lys Thr Gly Ala Lys Ile Lys Ile Lys Gly Asp Gly Cys Phe  
 35 40 45

Glu Glu Ser Glu Ser Gly Asn Leu Lys Leu Asn Lys Val Asp Ile Ser  
 50 55 60

Leu Gln Asp Cys Leu Ala Cys Ser Gly Cys Ile Thr Ser Ala Glu Glu  
 65 70 75 80

Val Leu Ile Thr Gln Gln Ser Arg Glu Glu Leu Leu Lys Val Leu Gln  
 85 90 95

Glu Asn Ser Lys Asn Lys Ala Ser Glu Asp Trp Asp Asn Val Arg Thr  
 100 105 110

Ile Val Phe Thr Leu Ala Thr Gln Pro Ile Leu Ser Leu Ala Tyr Arg

115

120

125

Tyr Gln Ile Gly Val Glu Asp Ala Ala Arg His Leu Asn Gly Tyr Phe  
 130 135 140

Arg Ser Leu Gly Ala Asp Tyr Val Leu Ser Thr Lys Val Ala Asp Asp  
 145 150 155 160

Ile Ala Leu Leu Glu Cys Arg Gln Glu Phe Val Asp Arg Tyr Arg Glu  
 165 170 175

Asn Glu Asn Leu Thr Met Leu Ser Ser Ser Cys Pro Gly Trp Val Cys  
 180 185 190

Tyr Ala Glu Lys Thr His Gly Asn Phe Leu Leu Pro Tyr Val Ser Thr  
 195 200 205

Thr Arg Ser Pro Gln Gln Ile Met Gly Val Leu Val Lys Gln Ile Leu  
 210 215 220

Ala Asp Lys Met Asn Val Pro Ala Ser Arg Ile Tyr His Val Thr Val  
 225 230 235 240

Met Pro Cys Tyr Asp Lys Lys Leu Glu Ala Ser Arg Glu Asp Phe Phe  
 245 250 255

Ser Lys Ala Asn Asn Ser Arg Asp Val Asp Cys Val Ile Thr Ser Val  
 260 265 270

Glu Val Glu Gln Leu Leu Ser Glu Ala Gln Gln Pro Leu Ser Gln Tyr  
 275 280 285

Asp Leu Leu Asp Leu Asp Trp Pro Trp Ser Asn Val Arg Pro Glu Phe  
 290 295 300

Met Val Trp Ala His Glu Lys Thr Leu Ser Gly Gly Tyr Ala Glu His  
 305 310 315 320

Ile Phe Lys Tyr Ala Ala Lys His Ile Phe Asn Glu Asp Leu Lys Thr  
 325 330 335

Glu Leu Glu Phe Lys Gln Leu Lys Asn Arg Asp Phe Arg Glu Ile Ile  
 340 345 350

Leu Lys Gln Asn Gly Lys Thr Val Leu Lys Phe Ala Ile Ala Asn Gly  
 355 360 365

Phe Arg Asn Ile Gln Asn Leu Val Gln Lys Leu Lys Arg Glu Lys Val  
 370 375 380

Ser Asn Tyr His Phe Val Glu Val Met Ala Cys Pro Ser Gly Cys Ile  
 385 390 395 400

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Asn Gly Gly Ala Gln Ile Arg Pro Thr Thr Gly Gln His Val Arg Glu  
405 410 415

Leu Thr Arg Lys Leu Glu Glu Leu Tyr Gln Asn Leu Pro Arg Ser Glu  
420 425 430

Pro Glu Asn Ser Leu Thr Lys His Ile Tyr Asn Asp Phe Leu Asp Gly  
435 440 445

Phe Gln Ser Asp Lys Ser Tyr Asp Val Leu His Thr Arg Tyr His Asp  
450 455 460

Val Val Ser Glu Leu Ser Ile Ser Leu Asn Ile Asn Trp  
465 470 475

<210> 58  
<211> 538  
<212> PRT  
<213> S. pombe

<400> 58

Met Ala Lys Leu Ser Val Asn Asp Leu Asn Asp Phe Leu Ser Pro Gly  
1 5 10 15

Ala Val Cys Ile Lys Pro Ala Gln Val Lys Lys Gln Glu Ser Lys Asn  
20 25 30

Asp Ile Arg Ile Asp Gly Asp Ala Tyr Tyr Glu Val Thr Lys Asp Thr  
35 40 45

Gly Glu Thr Ser Glu Leu Gly Ile Ala Ser Ile Ser Leu Asn Asp Cys  
50 55 60

Leu Ala Cys Ser Gly Cys Ile Thr Ser Ala Glu Thr Val Leu Val Asn  
65 70 75 80

Leu Gln Ser Tyr Gln Glu Val Leu Lys His Leu Glu Ser Arg Lys Ser  
85 90 95

Gln Glu Ile Leu Tyr Val Ser Leu Ser Pro Gln Val Arg Ala Asn Leu  
100 105 110

Ala Ala Tyr Tyr Gly Leu Ser Leu Gln Glu Ile Gln Ala Val Leu Glu  
115 120 125

Met Val Phe Ile Gly Lys Leu Gly Phe His Ala Ile Leu Asp Thr Asn  
130 135 140

Ala Ser Arg Glu Ile Val Leu Gln Gln Cys Ala Gln Glu Phe Cys Asn  
145 150 155 160

Ser Trp Leu Gln Ser Arg Ala His Lys Asn Gln Asn Gln Val Thr Asn  
165 170 175

Ser Val Val Asn Glu His Pro Leu Ile Pro His Ser Thr Ser Gln Ile  
 180 185 190  
 Ser Gly Val His Ser Asn Thr Ser Ser Asn Ser Gly Ile Asn Glu Asn  
 195 200 205  
 Ala Val Leu Pro Ile Leu Ser Ser Ser Cys Pro Gly Trp Ile Cys Tyr  
 210 215 220  
 Val Glu Lys Thr His Ser Asn Leu Ile Pro Asn Leu Ser Arg Val Arg  
 225 230 235 240  
 Ser Pro Gln Gln Ala Cys Gly Arg Ile Leu Lys Asp Trp Ala Val Gln  
 245 250 255  
 Gln Phe Ser Met Gln Arg Asn Asp Val Trp His Leu Ser Leu Met Pro  
 260 265 270  
 Cys Phe Asp Lys Lys Leu Glu Ala Ser Arg Asp Glu Phe Ser Glu Asn  
 275 280 285  
 Gly Val Arg Asp Val Asp Ser Val Leu Thr Pro Lys Glu Leu Val Glu  
 290 295 300  
 Met Phe Lys Phe Leu Arg Ile Asp Pro Ile Glu Leu Thr Lys Asn Pro  
 305 310 315 320  
 Ile Pro Phe Gln Gln Ser Thr Asp Ala Ile Pro Phe Trp Tyr Pro Arg  
 325 330 335  
 Ile Thr Tyr Glu Glu Gln Ile Gly Ser Ser Ser Gly Gly Tyr Met Gly  
 340 345 350  
 Tyr Val Leu Ser Tyr Ala Ala Lys Met Leu Phe Gly Ile Asp Asp Val  
 355 360 365  
 Gly Pro Tyr Val Ser Met Asn Asn Lys Asn Gly Asp Leu Thr Glu Tyr  
 370 375 380  
 Thr Leu Arg His Pro Glu Thr Asn Glu Gln Leu Ile Ser Met Ala Thr  
 385 390 395 400  
 Cys Tyr Gly Phe Arg Asn Ile Gln Asn Leu Val Arg Arg Val His Gly  
 405 410 415  
 Asn Ser Ser Val Arg Lys Gly Arg Val Leu Leu Lys Lys Arg Val Arg  
 420 425 430  
 Ser Asn Ala Gln Asn Pro Thr Glu Glu Pro Ser Arg Tyr Asp Tyr Val  
 435 440 445

Glu Val Met Ala Cys Pro Gly Gly Cys Ile Asn Gly Gly Gly Gln Leu  
 450 455 460

Pro Phe Pro Ser Val Glu Arg Ile Val Ser Ala Arg Asp Trp Met Gln  
 465 470 475 480

Gln Val Glu Lys Leu Tyr Tyr Glu Pro Gly Thr Arg Ser Val Asp Gln  
 485 490 495

Ser Ala Val Ser Tyr Met Leu Glu Gln Trp Val Lys Asp Pro Thr Leu  
 500 505 510

Thr Pro Lys Phe Leu His Thr Ser Tyr Arg Ala Val Gln Thr Asp Asn  
 515 520 525

Asp Asn Pro Leu Leu Leu Ala Asn Lys Trp  
 530 535

<210> 59  
 <211> 119  
 <212> PRT  
 <213> Metopus contortus

<400> 59

Ile Ile Phe Ala Glu Lys Asn Tyr Pro Glu Met Val Asn His Leu Ser  
 1 5 10 15

Thr Thr Lys Ser Pro Met Gln Met Leu Ser Ser Leu Ser Lys Gly Tyr  
 20 25 30

Trp Ala Lys Glu Gly Lys Lys Ile Asp Pro Lys Asn Val Val Asn Val  
 35 40 45

Ala Ile Met Pro Cys Thr Ala Lys Lys Ala Trp Lys Glu Arg Pro Asp  
 50 55 60

Met Lys Ala Asp Asn Gly Asp Pro Val Thr Asp Tyr Val Leu Thr Thr  
 65 70 75 80

Arg Glu Leu Gly Thr Met Leu Arg Gln Ser Asn Ile Asn Pro Val Ser  
 85 90 95

Leu Pro Lys Thr Pro Phe Asp Lys Ile Met Gly Glu Ser Thr Gly Ala  
 100 105 110

Ala Val Ile Phe Gly Ala Thr  
 115

<210> 60  
 <211> 462  
 <212> PRT  
 <213> Mus musculus

<400> 60

Met Lys Cys Glu His Cys Thr Arg Lys Glu Cys Ser Lys Lys Ser Lys  
 1 5 10 15  
 Asn Asp Asp Gln Glu Asn Val Ser Ser Asp Gly Ala Gln Pro Ser Asp  
 20 25 30  
 Gly Ala Ser Pro Ala Lys Glu Ser Glu Glu Lys Gly Glu Phe His Lys  
 35 40 45  
 Leu Ala Asp Ala Lys Ile Phe Leu Ser Asp Cys Leu Ala Cys Asp Ser  
 50 55 60  
 Cys Val Thr Val Glu Glu Gly Val Gln Leu Ser Gln Gln Ser Ala Lys  
 65 70 75 80  
 Asp Phe Leu His Val Leu Asn Leu Asn Lys Arg Cys Asp Thr Ser Lys  
 85 90 95  
 His Arg Val Leu Val Val Ser Val Cys Pro Gln Ser Leu Pro Tyr Phe  
 100 105 110  
 Ala Ala Lys Phe Asn Leu Ser Val Thr Asp Ala Ser Arg Arg Leu Cys  
 115 120 125  
 Gly Phe Leu Lys Ser Leu Gly Val His Tyr Val Phe Asp Thr Thr Ile  
 130 135 140  
 Ala Ala Asp Phe Ser Ile Leu Glu Ser Gln Lys Glu Phe Val Arg Arg  
 145 150 155 160  
 Tyr His Gln His Ser Glu Glu Gln Arg Glu Leu Pro Met Leu Thr Ser  
 165 170 175  
 Ala Cys Pro Gly Trp Val Arg Tyr Ala Glu Arg Val Leu Gly Arg Pro  
 180 185 190  
 Ile Ile Pro Tyr Leu Cys Thr Ala Lys Ser Pro Gln Gln Val Met Gly  
 195 200 205  
 Ser Leu Val Lys Asp Tyr Phe Ala Arg Gln Gln Asn Leu Ser Pro Glu  
 210 215 220  
 Lys Ile Phe His Val Val Val Ala Pro Cys Tyr Asp Lys Lys Leu Glu  
 225 230 235 240  
 Ala Leu Arg Glu Gly Leu Ser Thr Thr Leu Asn Gly Ala Arg Gly Thr  
 245 250 255  
 Asp Cys Val Leu Thr Ser Gly Glu Ile Ala Gln Ile Met Glu Gln Ser  
 260 265 270  
 Asp Leu Ser Val Lys Asp Ile Ala Val Asp Thr Leu Phe Gly Asp Met  
 275 280 285



Lys Glu Val Ala Val Gln Arg His Asp Gly Val Ser Ser Asp Gly His  
 290 295 300

Leu Ala His Val Phe Arg His Ala Ala Lys Glu Leu Phe Gly Glu His  
 305 310 315 320

Val Glu Glu Ile Thr Tyr Arg Ala Leu Arg Asn Lys Asp Phe His Glu  
 325 330 335

Val Thr Leu Glu Lys Asn Gly Glu Val Leu Leu Arg Phe Ala Ala Ala  
 340 345 350

Tyr Gly Phe Arg Asn Ile Gln Asn Met Ile Gln Lys Leu Lys Lys Gly  
 355 360 365

Lys Leu Pro Tyr His Phe Val Glu Val Leu Ala Cys Pro Arg Gly Cys  
 370 375 380

Leu Asn Gly Arg Gly Gln Ala Gln Thr Glu Asp Gly His Thr Asp Arg  
 385 390 395 400

Ala Leu Leu Gln Gln Met Glu Gly Ile Tyr Ser Gly Ile Pro Val Arg  
 405 410 415

Pro Pro Glu Ser Ser Thr His Val Gln Glu Leu Tyr Gln Glu Trp Leu  
 420 425 430

Glu Gly Thr Glu Ser Pro Lys Val Gln Glu Val Leu His Thr Ser Tyr  
 435 440 445

Gln Ser Leu Glu Pro Cys Thr Asp Gly Leu Asp Ile Lys Trp  
 450 455 460

<210> 61  
 <211> 457  
 <212> PRT  
 <213> Caenorhabditis elegans

<400> 61

Met Glu Asp Ser Gly Phe Ser Gly Val Val Arg Leu Ser Asn Val Ser  
 1 5 10 15

Asp Phe Ile Ala Pro Asn Leu Asp Cys Ile Ile Pro Leu Glu Thr Arg  
 20 25 30

Thr Val Glu Lys Lys Lys Glu Glu Ser Gln Val Asn Ile Arg Thr Lys  
 35 40 45

Lys Pro Lys Asp Lys Glu Ser Ser Lys Thr Glu Glu Lys Lys Ser Val  
 50 55 60

Lys Ile Ser Leu Ala Asp Cys Leu Ala Cys Ser Gly Cys Ile Thr Ser  
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65

70

75

80

Ala Glu Thr Val Leu Val Glu Glu Gln Ser Phe Gly Arg Val Tyr Glu  
85 90 95

Gly Ile Gln Asn Ser Lys Leu Ser Val Val Thr Val Ser Pro Gln Ala  
100 105 110

Ile Thr Ser Ile Ala Val Lys Ile Gly Lys Ser Thr Asn Glu Val Ala  
115 120 125

Lys Ile Ile Ala Ser Phe Phe Arg Arg Leu Gly Val Lys Tyr Val Ile  
130 135 140

Asp Ser Ser Phe Ala Arg Lys Phe Ala His Ser Leu Ile Tyr Glu Glu  
145 150 155 160

Leu Ser Thr Thr Pro Ser Thr Ser Arg Pro Leu Leu Ser Ser Ala Cys  
165 170 175

Pro Gly Phe Val Cys Tyr Ala Glu Lys Ser His Gly Glu Leu Leu Ile  
180 185 190

Pro Lys Ile Ser Lys Ile Arg Ser Pro Gln Ala Ile Ser Gly Ala Ile  
195 200 205

Ile Lys Gly Phe Leu Ala Lys Arg Glu Gly Leu Ser Pro Cys Asp Val  
210 215 220

Phe His Ala Ala Val Met Pro Cys Phe Asp Lys Lys Leu Glu Ala Ser  
225 230 235 240

Arg Glu Gln Phe Lys Val Asp Gly Thr Asp Val Arg Glu Thr Asp Cys  
245 250 255

Val Ile Ser Thr Ala Glu Leu Leu Glu Glu Ile Ile Lys Leu Glu Asn  
260 265 270

Asp Glu Ala Gly Asp Val Glu Asn Arg Ser Glu Glu Glu Gln Trp Leu  
275 280 285

Ser Ala Leu Ser Lys Gly Ser Val Ile Gly Asp Asp Gly Gly Ala Ser  
290 295 300

Gly Gly Tyr Ala Asp Arg Ile Val Arg Asp Phe Val Leu Glu Asn Gly  
305 310 315 320

Gly Gly Ile Val Lys Thr Ser Lys Leu Asn Lys Asn Met Phe Ser Thr  
325 330 335

Thr Val Glu Ser Glu Ala Gly Glu Ile Leu Leu Arg Val Ala Lys Val  
340 345 350

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Tyr Gly Phe Arg Asn Val Gln Asn Leu Val Arg Lys Met Lys Thr Lys  
 355 360 365  
 Lys Glu Lys Thr Asp Tyr Val Glu Ile Met Ala Cys Pro Gly Gly Cys  
 370 375 380  
 Ala Asn Gly Gly Gly Gln Ile Arg Tyr Glu Thr Met Asp Glu Arg Glu  
 385 390 395 400  
 Glu Lys Leu Ile Lys Val Glu Ala Leu Tyr Glu Asp Leu Pro Arg Gln  
 405 410 415  
 Asp Asp Glu Glu Thr Trp Ile Lys Val Arg Glu Glu Trp Glu Lys Leu  
 420 425 430  
 Asp Lys Asn Tyr Arg Asn Leu Leu Phe Thr Asp Tyr Arg Pro Val Glu  
 435 440 445  
 Thr Asn Val Ala Gln Val Leu Lys Trp  
 450 455  
 <210> 62  
 <211> 462  
 <212> PRT  
 <213> Mus musculus  
 <400> 62  
 Met Lys Cys Glu His Cys Thr Arg Lys Glu Cys Ser Lys Lys Ser Lys  
 1 5 10 15  
 Thr Asp Asp Gln Glu Asn Val Ser Ser Asp Gly Ala Gln Pro Ser Asp  
 20 25 30  
 Gly Ala Ser Pro Ala Lys Glu Ser Glu Glu Lys Gly Glu Phe His Lys  
 35 40 45  
 Leu Ala Asp Ala Lys Ile Phe Leu Ser Asp Cys Leu Ala Cys Asp Ser  
 50 55 60  
 Cys Val Thr Val Glu Glu Gly Val Gln Leu Ser Gln Gln Ser Ala Lys  
 65 70 75 80  
 Asp Phe Leu His Val Leu Asn Leu Asn Lys Arg Cys Asp Thr Ser Lys  
 85 90 95  
 His Arg Val Leu Val Val Ser Val Cys Pro Gln Ser Leu Pro Tyr Phe  
 100 105 110  
 Ala Ala Lys Phe Asn Leu Ser Val Thr Asp Ala Ser Arg Arg Leu Cys  
 115 120 125  
 Gly Phe Leu Lys Ser Leu Gly Val His Tyr Val Phe Asp Thr Thr Ile  
 130 135 140

Ala Ala Asp Phe Ser Ile Leu Glu Ser Gln Lys Glu Phe Val Arg Arg  
 145 150 155 160  
 Tyr His Gln His Ser Glu Glu Gln Arg Glu Leu Pro Met Leu Thr Ser  
 165 170 175  
 Ala Cys Pro Gly Trp Val Arg Tyr Ala Glu Arg Val Leu Gly Arg Pro  
 180 185 190  
 Ile Ile Pro Tyr Leu Cys Thr Ala Lys Ser Pro Gln Gln Val Met Gly  
 195 200 205  
 Ser Leu Val Lys Asp Tyr Phe Ala Arg Gln Gln Asn Leu Ser Pro Glu  
 210 215 220  
 Lys Ile Phe His Val Val Val Ala Pro Cys Tyr Asp Lys Lys Leu Glu  
 225 230 235 240  
 Ala Leu Arg Glu Gly Leu Ser Thr Thr Leu Asn Gly Ala Arg Gly Thr  
 245 250 255  
 Asp Cys Val Leu Thr Ser Gly Glu Ile Ala Gln Ile Met Glu Gln Ser  
 260 265 270  
 Asp Leu Ser Val Lys Asp Ile Ala Val Asp Thr Leu Phe Gly Asp Met  
 275 280 285  
 Lys Glu Val Ala Val Gln Arg His Asp Gly Val Ser Ser Asp Gly His  
 290 295 300  
 Leu Ala His Val Phe Arg His Ala Ala Lys Glu Leu Phe Gly Glu His  
 305 310 315 320  
 Val Glu Glu Ile Thr Tyr Arg Ala Leu Arg Asn Lys Asp Phe His Glu  
 325 330 335  
 Val Thr Leu Glu Lys Asn Gly Glu Val Leu Leu Arg Phe Ala Ala Ala  
 340 345 350  
 Tyr Gly Phe Arg Asn Ile Gln Asn Met Ile Gln Lys Leu Lys Lys Gly  
 355 360 365  
 Lys Leu Pro Tyr His Phe Val Glu Val Leu Ala Cys Pro Arg Gly Cys  
 370 375 380  
 Leu Asn Gly Arg Gly Gln Ala Gln Thr Glu Asp Gly His Thr Asp Arg  
 385 390 395 400  
 Ala Leu Leu Gln Gln Met Glu Gly Ile Tyr Ser Gly Ile Pro Val Arg  
 405 410 415

Pro Pro Glu Ser Ser Thr His Val Gln Glu Leu Tyr Gln Glu Trp Leu  
                   420                  425                  430

Glu Gly Thr Glu Ser Pro Lys Val Gln Glu Val Leu His Thr Ser Tyr  
                   435                  440                  445

Gln Ser Leu Glu Pro Cys Thr Asp Gly Leu Asp Ile Lys Trp  
           450                  455                  460

<210> 63  
 <211> 119  
 <212> PRT  
 <213> Neocallimastix

<400> 63

Ile Met Phe Ala Glu Lys Asn Phe Pro Asp Met Val Asn Asn Leu Ser  
 1                  5                  10                  15

Thr Thr Lys Ser Pro Met Gln Met Leu Ser Ser Leu Thr Lys Gly Tyr  
           20                  25                  30

Trp Ala Lys Asp Ile Lys Lys Ile Asn Pro Lys Asp Val Val Asn Val  
           35                  40                  45

Ala Ile Met Pro Cys Thr Ala Lys Lys Gln Glu Lys Asp Arg Pro Gly  
           50                  55                  60

Met Lys Thr Asp Glu Gly Asp Lys Val Thr Asp Phe Val Leu Thr Thr  
 65                  70                  75                  80

Arg Glu Leu Gly Met Met Leu Arg Gln Ala Asn Ile Asp Pro Thr Lys  
                   85                  90                  95

Leu Pro Gly Thr Lys Phe Asp Lys Val Met Gly Glu Ser Thr Gly Ala  
           100                  105                  110

Ala Val Ile Phe Gly Ala Thr  
           115

<210> 64  
 <211> 119  
 <212> PRT  
 <213> Nyctotherus ovalis

<400> 64

Ile Ile Phe Met Glu Lys Asn Tyr Pro Asp Met Leu Ser His Leu Ser  
 1                  5                  10                  15

Thr Cys Lys Ser Pro Gln Gly Met Leu Gly Ala Leu Ile Lys Gly Tyr  
           20                  25                  30

Trp Ala Lys Lys Val Lys Lys Val Asp Pro Lys Asp Val Val Ser Val  
           35                  40                  45

Ser Ile Met Pro Cys Thr Ala Lys Lys Ala Glu Lys Glu Arg Pro Gln  
 50 55 60

Leu Arg Gly Asp Glu Gly Phe Lys Asp Val Asp Tyr Val Leu Thr Thr  
 65 70 75 80

Arg Glu Leu Ala Lys Met Leu Lys Gln Ser Asn Ile Asp Leu Gly Lys  
 85 90 95

Val Glu Pro Thr Pro Phe Asp Ala Val Met Ser Glu Gly Thr Gly Ala  
 100 105 110

Ala Val Ile Phe Gly Val Thr  
 115

<210> 65  
 <211> 490  
 <212> PRT  
 <213> Clostridium perfringens

<400> 65

Met Ala Ile Lys Asp Ala Asn Lys Gln Tyr Ile Lys Phe Asp Thr Ala  
 1 5 10 15

Val Gln Val Leu Lys Tyr Glu Val Leu Lys Arg Ile Ala Glu Lys Glu  
 20 25 30

Phe Asp Gly Thr Leu Asp Lys Glu Lys Leu Asn Ile Ala Lys Glu Ile  
 35 40 45

Val Asp Asp Leu Lys Pro Asn Val Arg Cys Cys Ile Tyr Lys Glu Arg  
 50 55 60

Ala Ile Val Glu Glu Arg Met Lys Leu Ala Leu Gly Gly His Glu Asn  
 65 70 75 80

Arg Glu Asn Met Ile Glu Val Ile Asp Ile Ala Cys Asp Glu Cys Pro  
 85 90 95

Val Asn Arg Phe Ile Val Thr Asp Ala Cys Arg Gly Cys Leu Ala Lys  
 100 105 110

Lys Cys Arg Asp Ser Cys Asn Phe Gly Ala Ile Ser Phe Asp Asn Arg  
 115 120 125

Lys Cys Lys Ile Asp Tyr Glu Lys Cys Lys Glu Cys Gly Lys Cys Lys  
 130 135 140

Glu Val Cys Pro Tyr Asn Ala Ile Ala Glu Val Lys Arg Pro Cys Met  
 145 150 155 160

Arg Ala Cys Ile Pro Lys Ala Leu Ser Tyr Asp Val Asp Ser Lys Lys  
 165 170 175

061010 third listing.txt

Ala Val Ile Asp Asp Ser Lys Cys Ile Gln Cys Gly Ala Cys Val Val  
180 185 190

Asp Cys Pro Phe Gly Ala Ile Met Asp Lys Ser Tyr Leu Val Asp Val  
195 200 205

Ile Arg Leu Leu Lys Asp Glu Lys Lys Val Tyr Ala Ile Val Ala Pro  
210 215 220

Ala Ile Ser Ser Gln Phe Asn His Ser Lys Ile Gly Lys Val Ile Thr  
225 230 235 240

Ala Ile Lys Lys Leu Gly Phe Glu Asp Val Phe Glu Ala Ala Leu Gly  
245 250 255

Ala Asp Leu Val Ala Val His Glu Cys Asn Glu Phe Lys Glu Lys Gly  
260 265 270

Glu Leu Asp Phe Met Thr Thr Ser Cys Cys Pro Ala Phe Val Ser Tyr  
275 280 285

Ile Glu Lys Asn Tyr Pro Glu Leu Lys Glu Cys Ile Ser Asn Thr Val  
290 295 300

Ser Pro Met Val Ala Met Ala Arg Leu Ile Lys Ser Gln Asn Lys Asp  
305 310 315 320

Val Lys Thr Val Phe Ile Gly Pro Cys Ile Ala Lys Lys Thr Glu Ala  
325 330 335

Lys Arg Asn Glu Val Ser Gly Asp Val Asp Tyr Val Leu Thr Phe Glu  
340 345 350

Glu Leu Leu Ala Leu Leu Asp Ser Arg Asn Ile Lys Ile Asp Glu Cys  
355 360 365

Glu Glu Ser Asp Thr Lys His Gly Ser Phe Tyr Gly Arg Leu Phe Ala  
370 375 380

Arg Ser Gly Gly Val Thr Glu Ser Val Lys His Leu Ile Asp Ser Glu  
385 390 395 400

Gly Ile Lys Val Asp Phe Arg Pro Ile Leu Gly Asp Gly Ile Lys Asp  
405 410 415

Cys Asp Ile Lys Leu Arg Leu Ala Lys Leu Lys Arg Ala Gln Gly Asn  
420 425 430

Phe Leu Glu Gly Met Ala Cys Lys Gly Gly Cys Ile Asn Gly Pro Gly  
435 440 445

Ser Leu Asn His Asp Ile Lys Asn Ser Lys Glu Val Asp Lys Tyr Gly

450

455

460

Glu Leu Ser Ser Ser Glu Lys Ile Lys Asp Thr Leu Ala Asp Ile Lys  
 465 470 475 480

Phe Glu Asp Leu Asn Leu Ser Lys Asn Glu  
 485 490

<210> 66  
 <211> 456  
 <212> PRT  
 <213> Homo sapiens

<400> 66

Met Lys Cys Glu His Cys Thr Arg Lys Glu Cys Ser Lys Lys Thr Lys  
 1 5 10 15

Thr Asp Asp Gln Glu Asn Val Ser Ala Asp Ala Pro Ser Pro Ala Gln  
 20 25 30

Glu Asn Gly Glu Lys Gly Glu Phe His Lys Leu Ala Asp Ala Lys Ile  
 35 40 45

Phe Leu Ser Asp Cys Leu Ala Cys Asp Ser Cys Met Thr Ala Glu Glu  
 50 55 60

Gly Val Gln Leu Ser Gln Gln Asn Ala Lys Asp Phe Phe Arg Val Leu  
 65 70 75 80

Asn Leu Asn Lys Lys Cys Asp Thr Ser Lys His Lys Val Leu Val Val  
 85 90 95

Ser Val Cys Pro Gln Ser Leu Pro Tyr Phe Ala Ala Lys Phe Asn Leu  
 100 105 110

Ser Val Thr Asp Ala Ser Arg Arg Leu Cys Gly Phe Leu Lys Ser Leu  
 115 120 125

Gly Val His Tyr Val Phe Asp Thr Thr Ile Ala Ala Asp Phe Ser Ile  
 130 135 140

Leu Glu Ser Gln Lys Glu Phe Val Arg Arg Tyr Arg Gln His Ser Glu  
 145 150 155 160

Glu Glu Arg Thr Leu Pro Met Leu Thr Ser Ala Cys Pro Gly Trp Val  
 165 170 175

Arg Tyr Ala Glu Arg Val Leu Gly Arg Pro Ile Thr Ala His Leu Cys  
 180 185 190

Thr Ala Lys Ser Pro Gln Gln Val Met Gly Ser Leu Val Lys Asp Tyr  
 195 200 205



Phe Ala Arg Gln Gln Asn Leu Ser Pro Glu Lys Ile Phe His Val Ile  
 210 215 220  
 Val Ala Pro Cys Tyr Asp Lys Lys Leu Glu Ala Leu Gln Glu Ser Leu  
 225 230 235 240  
 Pro Pro Ala Leu His Gly Ser Arg Gly Ala Asp Cys Val Leu Thr Ser  
 245 250 255  
 Gly Glu Ile Ala Gln Ile Met Glu Gln Gly Asp Leu Ser Val Arg Asp  
 260 265 270  
 Ala Ala Val Asp Thr Leu Phe Gly Asp Leu Lys Glu Asp Lys Val Thr  
 275 280 285  
 Arg His Asp Gly Ala Ser Ser Asp Gly His Leu Ala His Ile Phe Arg  
 290 295 300  
 His Ala Ala Lys Glu Leu Phe Asn Glu Asp Val Glu Glu Val Thr Tyr  
 305 310 315 320  
 Arg Ala Leu Arg Asn Lys Asp Phe Gln Glu Val Thr Leu Glu Lys Asn  
 325 330 335  
 Gly Glu Val Val Leu Arg Phe Ala Ala Tyr Gly Phe Arg Asn Ile  
 340 345 350  
 Gln Asn Met Ile Leu Lys Leu Lys Lys Gly Lys Phe Pro Phe His Phe  
 355 360 365  
 Val Glu Val Leu Ala Cys Ala Gly Gly Cys Leu Asn Gly Arg Gly Gln  
 370 375 380  
 Ala Gln Thr Pro Asp Gly His Ala Asp Lys Ala Leu Leu Arg Gln Met  
 385 390 395 400  
 Glu Gly Ile Tyr Ala Asp Ile Pro Val Arg Arg Pro Glu Ser Ser Ala  
 405 410 415  
 His Val Gln Glu Leu Tyr Gln Glu Trp Leu Glu Gly Ile Asn Ser Pro  
 420 425 430  
 Lys Ala Arg Glu Val Leu His Thr Thr Tyr Gln Ser Gln Glu Arg Gly  
 435 440 445  
 Thr His Ser Leu Asp Ile Lys Trp  
 450 455

<210> 67  
 <211> 408  
 <212> PRT  
 <213> Homo sapiens  
 <400> 67

061010 third listing.txt

Met Lys Cys Glu His Cys Thr Arg Lys Glu Cys Ser Lys Lys Thr Lys  
1 5 10 15

Thr Asp Asp Gln Glu Asn Val Ser Ala Asp Ala Pro Ser Pro Ala Gln  
20 25 30

Glu Asn Gly Glu Lys Cys Asp Thr Ser Lys His Lys Val Leu Val Val  
35 40 45

Ser Val Cys Pro Gln Ser Leu Pro Tyr Phe Ala Ala Lys Phe Asn Leu  
50 55 60

Ser Val Thr Asp Ala Ser Arg Arg Leu Cys Gly Phe Leu Lys Ser Leu  
65 70 75 80

Gly Val His Tyr Val Phe Asp Thr Thr Ile Ala Ala Asp Phe Ser Ile  
85 90 95

Leu Glu Ser Gln Lys Glu Phe Val Arg Arg Tyr Arg Gln His Ser Glu  
100 105 110

Glu Glu Arg Thr Leu Pro Met Leu Thr Ser Ala Cys Pro Gly Trp Val  
115 120 125

Arg Tyr Ala Glu Arg Val Leu Gly Arg Pro Ile Thr Ala His Leu Cys  
130 135 140

Thr Ala Lys Ser Pro Gln Gln Val Met Gly Ser Leu Val Lys Asp Tyr  
145 150 155 160

Phe Ala Arg Gln Gln Asn Leu Ser Pro Glu Lys Ile Phe His Val Ile  
165 170 175

Val Ala Pro Cys Tyr Asp Lys Lys Leu Glu Ala Leu Gln Glu Ser Leu  
180 185 190

Pro Pro Ala Leu His Gly Ser Arg Gly Ala Asp Cys Val Leu Thr Ser  
195 200 205

Gly Glu Ile Ala Gln Ile Met Glu Gln Gly Asp Leu Ser Val Arg Asp  
210 215 220

Ala Ala Val Asp Thr Leu Phe Gly Asp Leu Lys Glu Asp Lys Val Thr  
225 230 235 240

Arg His Asp Gly Ala Ser Ser Asp Gly His Leu Ala His Ile Phe Arg  
245 250 255

His Ala Ala Lys Glu Leu Phe Asn Glu Asp Val Glu Glu Val Thr Tyr  
260 265 270

Arg Ala Leu Arg Asn Lys Asp Phe Gln Glu Val Thr Leu Glu Lys Asn

275

Gly Glu Val Val Leu Arg Phe Ala Ala Ala Tyr Gly Phe Arg Asn Ile  
290 295 300

Gln Asn Met Ile Leu Lys Leu Lys Lys Gly Lys Phe Pro Phe His Phe  
305 310 315 320

Val Glu Val Leu Ala Cys Ala Gly Gly Cys Leu Asn Gly Arg Gly Gln  
325 330 335

Ala Gln Thr Pro Asp Gly His Ala Asp Lys Ala Leu Leu Arg Gln Met  
340 345 350

Glu Gly Ile Tyr Ala Asp Ile Pro Val Arg Arg Pro Glu Ser Ser Ala  
355 360 365

His Val Gln Glu Leu Tyr Gln Glu Trp Leu Glu Gly Ile Asn Ser Pro  
370 375 380

Lys Ala Arg Glu Val Leu His Thr Thr Tyr Gln Ser Gln Glu Arg Gly  
385 390 395 400

Thr His Ser Leu Asp Ile Lys Trp  
405

<210> 68  
<211> 502  
<212> PRT  
<213> Homo sapiens

<400> 68

Met Lys Cys Glu His Cys Thr Arg Lys Glu Cys Ser Lys Lys Thr Lys  
1 5 10 15

Thr Asp Asp Gln Glu Asn Val Ser Ala Asp Ala Pro Ser Pro Ala Gln  
20 25 30

Glu Asn Gly Glu Lys Gly Glu Phe His Lys Leu Ala Asp Ala Lys Ile  
35 40 45

Phe Leu Ser Asp Cys Leu Ala Cys Asp Ser Cys Met Thr Ala Glu Glu  
50 55 60

Gly Val Gln Leu Ser Gln Gln Asn Ala Lys Asp Phe Phe Arg Val Leu  
65 70 75 80

Asn Leu Asn Lys Lys Cys Asp Thr Ser Lys His Lys Val Leu Val Val  
85 90 95

Ser Val Cys Pro Gln Ser Leu Pro Tyr Phe Ala Ala Lys Phe Asn Leu  
100 105 110

Ser Val Thr Asp Ala Ser Arg Arg Leu Cys Gly Phe Leu Lys Ser Leu  
 115 120 125  
 Gly Val His Tyr Val Phe Asp Thr Thr Ile Ala Ala Asp Phe Ser Ile  
 130 135 140  
 Leu Glu Ser Gln Lys Glu Phe Val Arg Arg Tyr Arg Gln His Ser Glu  
 145 150 155 160  
 Glu Glu Arg Thr Leu Pro Met Leu Thr Ser Ala Cys Pro Gly Trp Val  
 165 170 175  
 Arg Tyr Ala Glu Arg Val Leu Gly Arg Pro Ile Thr Ala His Leu Cys  
 180 185 190  
 Thr Ala Lys Ser Pro Gln Gln Val Met Gly Ser Leu Val Lys Asp Tyr  
 195 200 205  
 Phe Ala Arg Gln Gln Asn Leu Ser Pro Glu Lys Ile Phe His Val Ile  
 210 215 220  
 Val Ala Pro Cys Tyr Asp Lys Lys Leu Glu Ala Leu Gln Glu Ser Leu  
 225 230 235 240  
 Pro Pro Ala Leu His Gly Ser Arg Gly Ala Asp Cys Val Leu Thr Ser  
 245 250 255  
 Glu Ile Ser Gln Ala Trp Trp Cys Thr Pro Val Ile Thr Ala Thr Arg  
 260 265 270  
 Glu Ala Ala Ala Arg Glu Ser Leu Glu Pro Gly Arg Gln Arg Leu Gln  
 275 280 285  
 Arg Asp Lys Ile Ala Pro Leu Asp Ser Ser Leu Gly Gly Gly Gly Glu  
 290 295 300  
 Ile Ala Gln Ile Met Glu Gln Gly Asp Leu Ser Val Arg Asp Ala Ala  
 305 310 315 320  
 Val Asp Thr Leu Phe Gly Asp Leu Lys Glu Asp Lys Val Thr Arg His  
 325 330 335  
 Asp Gly Ala Ser Ser Asp Gly His Leu Ala His Ile Phe Arg His Ala  
 340 345 350  
 Ala Lys Glu Leu Phe Asn Glu Asp Val Glu Glu Val Thr Tyr Arg Ala  
 355 360 365  
 Leu Arg Asn Lys Asp Phe Gln Glu Val Thr Leu Glu Lys Asn Gly Glu  
 370 375 380  
 Val Val Leu Arg Phe Ala Ala Ala Tyr Gly Phe Arg Asn Ile Gln Asn  
 385 390 395 400

Met Ile Leu Lys Leu Lys Lys Gly Lys Phe Pro Phe His Phe Val Glu  
 405 410 415

Val Leu Ala Cys Ala Gly Gly Cys Leu Asn Gly Arg Gly Gln Ala Gln  
 420 425 430

Thr Pro Asp Gly His Ala Asp Lys Ala Leu Leu Arg Gln Met Glu Gly  
 435 440 445

Ile Tyr Ala Asp Ile Pro Val Arg Arg Pro Glu Ser Ser Ala His Val  
 450 455 460

Gln Glu Leu Tyr Gln Glu Trp Leu Glu Gly Ile Asn Ser Pro Lys Ala  
 465 470 475 480

Arg Glu Val Leu His Thr Thr Tyr Gln Ser Gln Glu Arg Gly Thr His  
 485 490 495

Ser Leu Asp Ile Lys Trp  
 500

<210> 69  
 <211> 448  
 <212> PRT  
 <213> Clostridium tetani

<400> 69

Met His Asn Asp Tyr Arg Glu Ile Phe Lys Arg Leu Ser Lys Ser Tyr  
 1 5 10 15

Tyr Asp Asp Thr Phe Glu Lys Glu Val Glu Asn Ile Leu Ser Ser His  
 20 25 30

Ser Met Asp Arg Glu Lys Leu Ala Lys Ile Ile Ser Ile Leu Cys Gly  
 35 40 45

Val Asn Ile Glu His Ser Glu Asn Tyr Ile Ser Asn Leu Lys Asn Ala  
 50 55 60

Ile Lys Asn Tyr Thr Ala Ser Ala Glu Lys Val Val Thr Lys Leu Pro  
 65 70 75 80

Cys Ser Thr Gln Cys Ala Lys Asp Gly Asp Ile Ile Cys Glu Lys Ser  
 85 90 95

Cys Pro Val Asn Ala Ile Phe Arg Asp Pro Asn Asp Asn Asn Ile Tyr  
 100 105 110

Ile Asn Asp Glu Leu Cys Leu Asp Cys Gly Leu Cys Val Arg Asn Cys  
 115 120 125

Pro Ser Gly Ser Ile Leu Asp Lys Lys Glu Phe Ile Pro Leu Ala Glu

130

135

140

Leu Leu Lys Ser Glu Ser Ile Val Ile Ala Ala Val Ala Pro Ala Ile  
 145 150 155 160

Met Gly Gln Phe Gly Glu Asn Thr Thr Ile Asn Gln Leu Arg Thr Ala  
 165 170 175

Phe Lys Lys Leu Gly Phe Thr Asp Met Val Glu Val Ala Phe Phe Ala  
 180 185 190

Asp Met Leu Thr Leu Lys Glu Ala Val Glu Tyr Asp His Phe Val Lys  
 195 200 205

Asp Glu Gln Asp Phe Met Ile Thr Ser Cys Cys Cys Pro Met Trp Val  
 210 215 220

Gly Met Leu Lys Lys Val Tyr Asn Asp Leu Val Lys Tyr Val Ser Pro  
 225 230 235 240

Ser Val Ser Pro Met Ile Ala Ala Gly Arg Val Leu Lys Leu Leu Asn  
 245 250 255

Pro Asn Cys Lys Val Val Phe Val Gly Pro Cys Ile Ala Lys Lys Ala  
 260 265 270

Glu Ala Arg Glu Lys Asp Leu Leu Gly Asp Ile Asp Phe Val Leu Thr  
 275 280 285

Phe Thr Glu Leu Arg Asp Ile Phe Asp Val Phe Asp Ile Gln Pro Glu  
 290 295 300

Asn Leu Glu Glu Asp Phe Ser Ser Glu Tyr Ala Ser Lys Gly Gly Arg  
 305 310 315 320

Leu Tyr Ala Arg Thr Gly Gly Val Ser Ile Ala Val Ser Glu Ala Ile  
 325 330 335

Glu Lys Leu Phe Pro Asn Lys Tyr Lys Phe Leu Lys Thr Ile Gln Ala  
 340 345 350

Asp Gly Val Lys Gly Cys Lys Ser Leu Leu Asp Lys Ile Lys Gln Glu  
 355 360 365

Asp Ile Ser Ala Asn Phe Val Glu Gly Met Gly Cys Val Gly Gly Cys  
 370 375 380

Val Gly Gly Pro Lys Val Ile Ile Asp Pro Ser Glu Gly Arg Asn Ala  
 385 390 395 400

Val Asn Asn Phe Ala Glu Asn Ser Ser Ile Lys Val Ser Val Asp Ser  
 405 410 415

061010 third listing.txt

Asn Cys Met Asn Asp Ile Leu Ser Lys Ile Asn Ile Asn Ser Val Glu  
420 425 430

Asp Phe Lys Asp Lys Asp Lys Ile Ser Ile Phe Glu Arg Glu Phe Lys  
435 440 445

<210> 70  
<211> 459  
<212> PRT  
<213> Desulfovibrio desulfuricans

<400> 70

Met Tyr Phe Arg Thr Tyr Asp Asn Thr Ile Asn Phe Glu Ile Met Val  
1 5 10 15

Arg Ile Ala Lys Ala Phe His Gly Asp Ser Phe Glu Glu Gln Val Ala  
20 25 30

Arg Ile Pro Leu Glu Met Arg Pro Arg Lys Ala His Ser Ser Arg Cys  
35 40 45

Cys Ile Tyr Arg Asp Arg Ala Ile Ile Arg Tyr Arg Cys Met Ala Met  
50 55 60

Leu Gly Tyr Ala Ile Glu Asp Glu Thr Asp Glu Leu Thr Ser Leu Ser  
65 70 75 80

Gln Tyr Ala Lys Gly Ala Leu Glu Arg Asp Ser Ile Gln Gly Ser Met  
85 90 95

Leu Thr Phe Ile Asp Glu Ala Cys Asn Gly Cys Val Arg Thr His Tyr  
100 105 110

Glu Ala Thr Ser Ala Cys Arg Gly Cys Leu Ala Glu Ala Cys Val Gln  
115 120 125

His Cys Pro Lys Asp Ala Val Arg Ile Val Asp Gly Lys Ser Arg Ile  
130 135 140

Asp Pro Asp Lys Cys Val Gln Cys Gly Lys Cys Met Asn Val Cys Pro  
145 150 155 160

Tyr His Ala Ile Val Gln Ile Pro Ile Pro Cys Glu Glu Ser Cys Pro  
165 170 175

Thr Gly Ala Ile Ser Lys Asp Glu Cys Gly Lys Gln Val Ile Asp Tyr  
180 185 190

Asp Arg Cys Ile Phe Cys Gly Lys Cys Met Ala Ala Cys Pro Phe Ala  
195 200 205

Ala Val Leu Glu Lys Ser Gln Met Ile Asp Val Leu Arg Arg Ile Arg  
210 215 220

061010 third listing.txt

Glu Gly Arg Lys Val Val Ala Ile Val Ala Pro Ala Ile Ala Gly Gln  
225 230 235 240

Val Gln Ala Pro Met Ser Arg Leu Ala Thr Ala Leu Arg Gln Leu Gly  
245 250 255

Phe Ala Asp Val Ala Glu Val Ala Ser Gly Ala Asp Thr Thr Ala Arg  
260 265 270

Leu Glu Ala Asp Glu Phe Val Glu Arg Met Glu His Gly Ala Ala Phe  
275 280 285

Met Thr Ser Ser Cys Cys Pro Ala Tyr Thr Gln Leu Val Asp Lys His  
290 295 300

Leu Pro Glu Leu Ala Pro Phe Val Ser Asp Thr Arg Thr Pro Met His  
305 310 315 320

Tyr Thr Ala Ala Met Val Lys Asp His Asp Pro Asp Met Val Thr Val  
325 330 335

Phe Ile Gly Pro Cys Val Ala Lys Arg Asn Glu Gly Lys His Asp Glu  
340 345 350

Leu Val Asp His Val Leu Thr Phe Gln Glu Met Val Ala Met Leu Thr  
355 360 365

Ala Ala Gly Ile Ser Val Asp Ala Cys Glu Asp Gly Arg Phe Met Phe  
370 375 380

Pro Ala Met Arg Glu Gly Arg Ser Phe Pro Val Ser Gly Gly Val Thr  
385 390 395 400

Ala Gly Val Gln Ala His Ile Gly Thr Arg Ala Glu Val Arg Pro Leu  
405 410 415

Ser Val Asp Gly Leu Asn Lys Lys Thr Phe Arg Gln Leu Lys Thr Trp  
420 425 430

Ala Lys Lys Gly Cys Glu Gly Asn Phe Val Glu Val Met Gly Cys Gln  
435 440 445

Gly Gly Cys Val Ala Gly Pro Ala Ile Val Met  
450 455

<210> 71  
<211> 494  
<212> PRT  
<213> Clostridium tetani

<400> 71

Met Ile Val Phe Glu Asn Gln Leu Lys Lys Leu Lys Tyr Leu Val Leu  
Page 124



1                      5                      10                      15  
 Lys Glu Val Ala Lys Met Thr Leu Glu Asp Arg Leu Gly Glu Glu Asp  
                     20                      25                      30  
 Ile Glu Arg Ile Ser Phe Asp Ile Ile Lys Gly Asp Lys Ala Glu Tyr  
                     35                      40                      45  
 Arg Cys Cys Val Tyr Lys Glu Arg Ala Ile Val Tyr Glu Arg Ala Lys  
                     50                      55                      60  
 Leu Ala Thr Gly Cys Leu Pro Asn Gly Gln Val Ala Glu Glu Phe Val  
                     65                      70                      75                      80  
 His Val Glu Asp Asp Asp Gln Ile Ile Tyr Val Ile Asp Ala Ala Cys  
                     85                      90                      95  
 Asp Lys Cys Pro Ile Asn Lys Tyr Val Val Thr Glu Ala Cys Arg Gly  
                     100                      105                      110  
 Cys Leu Gln His Lys Cys Met Glu Val Cys Pro Ala Gly Ser Ile Asn  
                     115                      120                      125  
 Arg Ala Ala Gly Lys Ala Tyr Ile Asn His Glu Thr Cys Lys Glu Cys  
                     130                      135                      140  
 Gly Leu Cys Glu Ser Ala Cys Pro Tyr Asn Ala Ile Ala Glu Val Met  
                     145                      150                      155                      160  
 Arg Pro Cys Arg Arg Ala Cys Pro Thr Gly Ala Leu Gln Met Asn Leu  
                     165                      170                      175  
 Glu Asp Asn Lys Ala Thr Ile Asn Lys Glu Asp Cys Ile Asn Cys Gly  
                     180                      185                      190  
 Ser Cys Met Ser Val Cys Pro Phe Gly Ala Ile Ser Asp Lys Ser Tyr  
                     195                      200                      205  
 Ile Val Asp Ile Thr Lys Ala Leu Lys Asn Asn Lys Lys Val Tyr Ala  
                     210                      215                      220  
 Met Val Ala Pro Ala Ile Thr Gly Gln Phe Gly Lys Asp Val Ser Val  
                     225                      230                      235                      240  
 Gly Lys Met Lys Asn Ala Phe Lys Ala Met Gly Phe Glu Asp Met Leu  
                     245                      250                      255  
 Glu Val Ala Cys Gly Ala Asp Ala Val Ala Ala His Glu Ser Glu Glu  
                     260                      265                      270  
 Phe Ile Glu Arg Leu Glu Ser Gly Lys Lys Tyr Met Thr Thr Ser Cys  
                     275                      280                      285

061010 third listing.txt

Cys Pro Gly Phe Leu Gly Tyr Ile Glu Lys Lys Phe Pro Asp Gln Leu  
290 295 300

Glu Asn Val Ser Asn Thr Val Ser Pro Met Val Ala Ile Gly Arg Met  
305 310 315 320

Ile Lys Lys Glu Tyr Glu Asp Ser Val Val Val Phe Val Gly Pro Cys  
325 330 335

Thr Ala Lys Lys Ala Glu Ile Lys Arg Lys Gly Ile Lys Asp Ala Val  
340 345 350

Asp Tyr Val Met Thr Phe Glu Glu Ile Ala Ala Leu Met Gly Ala Phe  
355 360 365

Glu Ile Asp Pro Ala Glu Cys Glu Glu Glu Asp Ile Asn Asp Gly Ser  
370 375 380

Asn Tyr Gly Arg Gly Phe Ala Gln Gly Gly Gly Val Val Ser Ala Ile  
385 390 395 400

Gln Asn Cys Ile Lys Asp Lys Glu Gly Ile Lys Phe Asn Pro Leu Arg  
405 410 415

Val Ser Gly Pro Asp Gln Ile Lys Arg Ala Met Ile Met Ala Lys Val  
420 425 430

Gly Lys Leu Ser Glu Asn Phe Ile Glu Gly Met Met Cys Glu Gly Gly  
435 440 445

Cys Ile Gly Gly Pro Ala Thr Met Val Ser Ala Val Lys Ala Lys Ala  
450 455 460

Pro Leu Met Lys Phe Ser Lys Ser Ser Thr Ile Lys Asp Val Lys Asp  
465 470 475 480

Asn Glu Val Leu Asp Lys Tyr Lys Asp Ile Asn Met Glu Arg  
485 490

<210> 72

<211> 203

<212> PRT

<213> Arabidopsis thaliana

<400> 72

Met Asp Leu Ile Lys Leu Lys Gly Val Asp Phe Lys Asp Leu Glu Glu  
1 5 10 15

Ser Pro Leu Asp Arg Val Leu Thr Asn Val Thr Glu Glu Gly Asp Leu  
20 25 30

Tyr Gly Val Ala Gly Ser Ser Gly Gly Tyr Ala Glu Thr Ile Phe Arg  
35 40 45

His Ala Ala Lys Ala Leu Phe Gly Gln Thr Ile Glu Gly Pro Leu Glu  
50 55 60

Phe Lys Thr Leu Arg Asn Ser Asp Phe Arg Glu Val Thr Leu Gln Leu  
65 70 75 80

Glu Gly Lys Thr Val Leu Lys Phe Ala Leu Cys Tyr Gly Phe Gln Asn  
85 90 95

Leu Gln Asn Ile Val Arg Arg Val Lys Thr Arg Lys Cys Asp Tyr Gln  
100 105 110

Tyr Val Glu Ile Met Ala Cys Pro Ala Gly Cys Leu Asn Gly Gly Gly  
115 120 125

Gln Ile Lys Pro Lys Thr Gly Gln Ser Gln Lys Glu Leu Ile His Ser  
130 135 140

Leu Glu Ala Thr Tyr Met Asn Asp Thr Thr Leu Asn Thr Asp Pro Tyr  
145 150 155 160

Gln Asn Pro Thr Ala Lys Arg Leu Phe Glu Glu Trp Leu Lys Glu Pro  
165 170 175

Gly Ser Asn Glu Ala Lys Lys Tyr Leu His Thr Gln Tyr His Pro Val  
180 185 190

Val Lys Ser Val Thr Ser Gln Leu Asn Asn Trp  
195 200

<210> 73  
<211> 449  
<212> PRT  
<213> Clostridium perfringens

<400> 73

Met Asn Lys Lys Tyr Asn Ser Leu Phe Lys Glu Leu Ile Ser Ser Tyr  
1 5 10 15

Tyr Ser Glu Asp Asn Phe Asp Glu Lys Leu Asn Asp Ile Val Lys Asn  
20 25 30

Asn Phe Asn Ser Lys Glu Asp Ala Ile Glu Val Leu Ser Ser Leu Cys  
35 40 45

Gly Val Asp Ile Asp Lys Asn Ser Asp Asn Ile Ala Tyr Asp Ile Arg  
50 55 60

Lys Ala Ile Thr Thr His Lys Ile Lys Lys Asn Ile Val Asp Lys Val  
65 70 75 80

Ser Val Cys Thr Lys Asn Cys Ser Lys Glu Ser Lys Gly Lys Cys Gln

Ser Leu Cys Pro Phe Asp Ala Ile Leu Thr Asp Pro Ile Asp Asn Ser  
 100 105 110  
 Lys Tyr Ile Asp Pro Asn Leu Cys Gln Asn Cys Gly Ile Cys Val Gln  
 115 120 125  
 Val Cys Glu Ser Gly His Phe Leu Asp Arg Ile Glu Leu Leu Pro Ile  
 130 135 140  
 Ile Asp Leu Ile Lys Asn Asn Glu Thr Val Ile Ala Ala Val Ala Pro  
 145 150 155 160  
 Ala Ile Ala Gly Gln Phe Gly Glu Asn Val Ser Leu Asp Met Leu Arg  
 165 170 175  
 Glu Ala Phe Ile Lys Ile Gly Phe Ser Asp Met Ile Glu Val Ala Phe  
 180 185 190  
 Ala Ala Asp Met Leu Ser Ile Lys Glu Ala Val Glu Phe Asn His His  
 195 200 205  
 Val Glu Lys Thr Gly Asp Ile Leu Ile Thr Ser Cys Cys Cys Pro Met  
 210 215 220  
 Trp Val Ala Met Leu Arg Lys Cys Tyr Lys Asp Leu Val Lys Asp Val  
 225 230 235 240  
 Ser Pro Ser Val Ser Pro Met Ile Ala Ala Gly Arg Val Ile Lys Lys  
 245 250 255  
 Leu Asn Lys Asp Ala Lys Val Val Phe Ile Gly Pro Cys Ile Ala Lys  
 260 265 270  
 Lys Ala Glu Ala Arg Glu Lys Asp Leu Val Gly Ala Ile Asp Tyr Val  
 275 280 285  
 Leu Thr Phe Glu Glu Leu Asn Gly Ile Phe Glu Ala Leu Lys Ile Asp  
 290 295 300  
 Pro Ser Ser Met Lys Gly Val Pro Ser Ile Glu Tyr Thr Ser Arg Gly  
 305 310 315 320  
 Gly Arg Leu Tyr Ala Arg Thr Gly Gly Val Ser Glu Ala Ile Asn Asp  
 325 330 335  
 Val Val Lys Glu Leu Tyr Pro Asp Lys Ala Lys Ile Phe Lys Ala Val  
 340 345 350  
 Gln Ala Asn Gly Val Lys Glu Cys Lys Glu Leu Leu Asn Lys Val Gln  
 355 360 365

061010 third listing.txt

Ser Gly Glu Leu Lys Ala Asn Phe Ile Glu Gly Met Gly Cys Val Gly  
370 375 380

Gly Cys Val Gly Gly Pro Lys Arg Ile Val Asp Pro Ser Ile Gly Lys  
385 390 395 400

Lys His Val Asp Glu Val Ala Tyr Asn Ser Pro Ile Lys Val Ala Thr  
405 410 415

His Ser His Thr Met Asp Glu Val Leu Leu Arg Leu Gly Ile Asn Ser  
420 425 430

Leu Lys Ser Phe Glu Asp Lys Glu Lys Ile Ser Ile Phe Glu Arg Glu  
435 440 445

Phe

<210> 74  
<211> 359  
<212> PRT  
<213> Desulfitobacterium hafniense

<400> 74

Met Ala Gln Ser Glu Ile Met Lys Ile Arg Arg Gln Val Leu Lys Ser  
1 5 10 15

Ala Leu Asp Trp Val Ser His Asp Gln Asn Arg Lys Asp Arg Ala Thr  
20 25 30

Leu Ala Arg Gln Ile Ile Pro Asp Gly Thr Pro Arg Tyr Arg Cys Cys  
35 40 45

Ile His Lys Glu Arg Ala Val Ile Glu Glu Arg Leu Lys Ala Val Leu  
50 55 60

Glu Pro Asp Glu Gly Pro Ile Val Arg Val Leu Lys Glu Gly Cys Asn  
65 70 75 80

Gly Cys Glu Met His Arg Tyr Ser Val Thr Asp His Cys Gln Asn Cys  
85 90 95

Val Gly His Phe Cys Phe Thr Asn Cys Pro Lys Lys Ala Ile Leu Phe  
100 105 110

Ile Asn Asn Lys Ala Phe Ile Asp Gln Thr Arg Cys Val Glu Cys Gly  
115 120 125

Leu Cys Ala Arg Asn Cys Pro Tyr His Ala Ile Ile Glu Tyr Arg Arg  
130 135 140

Pro Cys Glu Asp Ser Cys Pro Thr Lys Ala Ile Ser Val Arg Glu Asp  
145 150 155 160

Arg Ile Ala Ser Ile Ala Glu Ala His Cys Thr Ser Cys Gly Lys Cys  
165 170 175

Ile Ile Ser Cys Pro Phe Gly Ala Val Ala Glu Ser Ser Gln Leu Ile  
180 185 190

His Leu Phe Glu Ala Val Arg Asn Pro Glu His Lys Ile Tyr Ala Val  
195 200 205

Ile Ala Pro Ala Phe Val Gly Gln Phe Gly Arg Lys Val Ser Pro Gly  
210 215 220

Gln Val Lys Ser Ala Leu Leu Lys Leu Gly Phe Gln Asp Val Leu Glu  
225 230 235 240

Ala Ala Leu Gly Ala Asp Arg Thr Ile Glu Leu Glu Ala Arg Glu Tyr  
245 250 255

Asp Glu Arg Leu Ala His Gly Glu Glu Phe Met Thr Ser Ser Cys Cys  
260 265 270

Pro Ala Tyr Val Ser Ala Val Ile Lys Glu Lys Pro Asp Leu Phe His  
275 280 285

His Ile Ser Ser Thr Leu Ser Pro Met Ala Gln Val Ala His Ile Leu  
290 295 300

Lys Glu Lys Asp Pro Glu Ala Lys Ile Ala Phe Ile Gly Pro Cys Val  
305 310 315 320

Ala Lys Lys Glu Glu Gly Lys Arg Pro Glu Thr Lys Val Asp Phe Val  
325 330 335

Leu Thr Phe Glu Glu Leu Met Val Trp Leu Asp Tyr Ala Gly Ile Asn  
340 345 350

Pro Ala Glu Glu Ser Glu Gln  
355

<210> 75  
<211> 790  
<212> PRT  
<213> Geobacter metallireducens

<400> 75

Met Cys His Trp Leu His Arg Glu Ala Gly Leu Val Tyr Asp Pro Ala  
1 5 10 15

Val Asp Gln Ala Ile Asn Arg Val Ser Gly Leu Thr Leu Ser Ala Gly  
20 25 30

Arg Thr Met Glu Pro Ile Ile Thr Val Lys Glu Lys Cys Arg Lys Cys  
Page 130

Tyr Cys Cys Val Arg Ser Cys Pro Val Lys Ala Ile Lys Val Ala Lys  
 50 55 60  
 Ser Tyr Thr Glu Ile Ile Val Asp Arg Cys Ile Gly Cys Gly Asn Cys  
 65 70 75 80  
 Leu Ser Asn Cys Pro Gln Gln Ala Lys Met Val Ala Asp Lys Val Gly  
 85 90 95  
 Val Thr Glu Lys Leu Leu Ser Ser Gly Glu Glu Val Ile Ala Val Leu  
 100 105 110  
 Gly Ser Ser Phe Pro Ala Phe Phe His Asn Val Thr Pro Gly Gln Leu  
 115 120 125  
 Val Ala Gly Leu Arg Lys Ile Gly Phe Ala Glu Val His Glu Gly Ser  
 130 135 140  
 Tyr Gly Ala Glu Leu Ile Ala Asp Asp Tyr Ala Arg Ile Thr Ser Glu  
 145 150 155 160  
 Lys Gly His Pro Arg Ile Ser Ser His Cys Pro Ala Ile Val Asp Leu  
 165 170 175  
 Ile Glu Arg His Tyr Pro Lys Leu Val Gly Asn Leu Val Pro Val Val  
 180 185 190  
 Ser Pro Met Val Ala Met Gly Arg Tyr Leu Lys Gly Thr Leu Gly Gln  
 195 200 205  
 His Val Arg Val Val Tyr Ile Ser Ser Cys Val Ala Asn Lys Leu Glu  
 210 215 220  
 Thr Gln Thr Gln Glu Thr Arg Gly Ala Val Asp Ile Val Leu Thr Tyr  
 225 230 235 240  
 Arg Glu Leu Glu Gly Ile Phe Arg Ser Arg Gln Ile Ala Leu Pro Ala  
 245 250 255  
 Leu Ala Asp Glu Pro Leu Asp Gly Ile Arg Pro Gly Ala Gly Arg Leu  
 260 265 270  
 Phe Pro Ile Ala Asp Gly Thr Phe Arg Ala Phe Gly Ile Pro Phe Asp  
 275 280 285  
 Pro Leu Asp Thr Glu Ile Val Ala Ala Cys Gly Glu Val Asn Val Met  
 290 295 300  
 Gly Ile Ile Asn Asp Leu Ala Ala Gly Arg Ile Ser Pro Arg Ile Ala  
 305 310 315 320

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Asp Leu Arg Phe Cys Tyr Asp Gly Cys Ile Gly Gly Pro Gly Arg Asn  
 325 330 335  
 Arg Ala Leu Thr Glu Phe Tyr Arg Arg Asn Arg Val Ile Ala His Phe  
 340 345 350  
 Lys Gln Glu Val Pro Cys Arg Thr Val Pro Asn Ser Leu Leu Glu Ala  
 355 360 365  
 Gly Arg Val Ser Phe Gly Arg Ser Phe Ala Ser Lys Tyr Ala Lys Leu  
 370 375 380  
 Glu Ala Pro Lys Ala Asn Asp Val Arg Lys Ile Leu Asn Ala Thr Asn  
 385 390 395 400  
 Lys Phe Thr Val Lys Asp Glu Leu Asn Cys Arg Ala Cys Gly Tyr Arg  
 405 410 415  
 Thr Cys Arg Glu Tyr Ala Val Ala Val Phe Gln Gly Leu Ala Glu Ile  
 420 425 430  
 Glu Met Cys Leu Pro Tyr Asn Leu Gln Gln Leu Glu Glu Asp Arg Gly  
 435 440 445  
 Arg Leu Ile Gln Lys Tyr Glu Leu Ala Arg Arg Glu Leu Glu Arg Glu  
 450 455 460  
 Tyr Gly Asp Glu Phe Ile Val Gly Asn Asp Arg Lys Thr Leu Asp Val  
 465 470 475 480  
 Leu Gly Leu Ile Lys Gln Val Gly Pro Thr Pro Thr Thr Val Leu Ile  
 485 490 495  
 Arg Gly Glu Ser Gly Thr Gly Lys Glu Leu Thr Ala Arg Ala Ile His  
 500 505 510  
 Arg Tyr Ser Lys Arg Asn Asp Lys Pro Leu Val Thr Val Asn Cys Thr  
 515 520 525  
 Thr Ile Thr Asp Ser Leu Leu Glu Ser Glu Leu Phe Gly His Lys Arg  
 530 535 540  
 Gly Ala Phe Thr Gly Ala Val Ala Asp Lys Lys Gly Leu Phe Glu Ala  
 545 550 555 560  
 Ala Asp Gly Gly Thr Ile Phe Leu Asp Glu Ile Gly Asp Ile Thr Pro  
 565 570 575  
 Lys Leu Gln Ala Glu Leu Leu Arg Val Leu Asp Met Gly Glu Val Arg  
 580 585 590  
 Pro Val Gly Gly Thr Ala Ala Lys Lys Val Asp Val Arg Leu Ile Ala



Ala Thr Asn Lys Asn Leu Glu Gln Gly Val Arg Glu Gly Trp Phe Arg  
610 615 620

Glu Asp Leu Tyr Tyr Arg Leu Asn Val Phe Thr Ile Thr Met Pro Pro  
625 630 635 640

Leu Arg Ser Arg Val Glu Ser Ile Pro Ile Leu Val His His Phe Met  
645 650 655

Asp Lys Ala Ser Thr Lys Leu Asn Lys Arg Met Val Gly Ile Glu Asp  
660 665 670

Arg Ala Val Lys Ala Leu Thr Lys Tyr Pro Trp Pro Gly Asn Ile Arg  
675 680 685

Glu Met Gln Asn Val Ile Glu Arg Ala Ala Val Leu Thr His Asp Gly  
690 695 700

Val Ile Arg Val Glu Asn Phe Pro Leu Ala Leu Ser Glu Gly Leu Glu  
705 710 715 720

Glu Gly Phe Ala Thr Gly Leu Asp Ile His Ala Ala Ser Phe Arg Ser  
725 730 735

Glu Arg Glu Gln His Met Gly Lys Leu Glu Lys Lys Leu Ile Gln Arg  
740 745 750

Tyr Leu Thr Glu Ala Asn Gly Asn Ile Ser Arg Ala Ala Lys Leu Ala  
755 760 765

Asn Ile Pro Arg Arg Thr Phe Tyr Arg Leu Leu Asp Lys Tyr Arg Leu  
770 775 780

Arg Glu Arg Asp Val Arg  
785 790

<210> 76  
<211> 450  
<212> PRT  
<213> Clostridium acetobutylicum

<400> 76

Met Asn Asn Lys Tyr Ile Glu Leu Phe Lys Ser Leu Val Asp Ser Tyr  
1 5 10 15

Tyr Asn Asp Thr Phe Asp Ser Phe Val Tyr His Ile Leu Ser Asp Glu  
20 25 30

Glu Val Asp Lys Lys Glu Leu Ser Lys Val Ile Ser Ser Leu Cys Gly  
35 40 45

Val Ser Val Glu Phe Lys Asp Thr Glu Thr Tyr Ile Ser Glu Leu Lys  
 50 55 60  
 Lys Ala Ile Ser Asn Tyr Lys Cys Thr Asp Asn Ile Val Glu Lys Ile  
 65 70 75 80  
 Lys Glu Cys Asp Ser Ser Cys His Ser Asn Glu Gly Glu Thr Pro Cys  
 85 90 95  
 Gln Lys Ser Cys Pro Phe Asp Ala Ile Leu Val Asp Lys Asn Thr Lys  
 100 105 110  
 Thr Ser His Ile Gln Lys Asp Leu Cys Thr Asp Cys Gly Asn Cys Ile  
 115 120 125  
 Thr Ser Cys Pro Ser Gly Ser Ile Leu Asp Lys Ile Glu Phe Met Pro  
 130 135 140  
 Leu Leu Asn Leu Phe Lys Asn Asn Glu Thr Val Ile Ala Ala Val Ala  
 145 150 155 160  
 Pro Ala Ile Ala Gly Gln Phe Gly Glu Asn Val Ser Leu Glu Met Leu  
 165 170 175  
 Arg Thr Ala Phe Lys Lys Val Gly Phe Ala Asp Met Val Glu Val Ala  
 180 185 190  
 Phe Phe Ala Asp Met Leu Thr Ile Lys Glu Ala Phe Glu Phe Asn Glu  
 195 200 205  
 Leu Val Asn Ser Lys Asp Asp Leu Met Ile Thr Ser Cys Cys Cys Pro  
 210 215 220  
 Met Trp Val Ser Met Ile Arg Lys Ile Tyr Lys Asp Leu Ala Arg His  
 225 230 235 240  
 Val Ser Pro Ser Val Ser Pro Met Ile Ala Ser Gly Arg Val Ile Lys  
 245 250 255  
 Lys Leu Asn Pro Asn Cys Lys Val Val Phe Ile Gly Pro Cys Ile Ala  
 260 265 270  
 Lys Lys Ala Glu Ser Arg Ser Gln Asp Ile Ser Asp Ala Ile Asp Phe  
 275 280 285  
 Val Leu Thr Phe Glu Glu Leu Lys Gly Ile Phe Asp Val Leu Asp Ile  
 290 295 300  
 Asp Pro Glu Lys Leu Pro Glu Thr His Thr Lys Ser Tyr Ala Ser Arg  
 305 310 315 320  
 Glu Gly Arg Leu Tyr Gly Arg Thr Gly Gly Val Ser Thr Ser Val Asp  
 325 330 335

Glu Ala Val Lys Arg Ile Phe Pro Asn Lys His His Leu Phe Lys Ser  
                   340                  345                  350

Thr Lys Val Asp Gly Val Lys Asp Cys Lys Asp Ile Leu Asn Lys Thr  
           355                  360                  365

Gln Ala Gly Asn Ile Gly Ala Asn Phe Leu Glu Gly Met Gly Cys Val  
       370                  375                  380

Gly Gly Cys Val Gly Gly Pro Lys Ala Ile Val His Lys Asp Gln Gly  
   385                  390                  395                  400

Arg Glu Ser Val Asn Lys Thr Ala Glu Ser Ser Glu Ile Lys Ile Ser  
                   405                  410                  415

Val Asp Ser Glu Arg Met Lys Asp Ile Leu Ser Arg Ile Gly Ile Asn  
                   420                  425                  430

Ser Ile Glu Asp Phe Gly Asp Lys Ser Lys Val Asp Ile Phe Glu Arg  
           435                  440                  445

Arg Phe  
       450

<210> 77  
 <211> 106  
 <212> PRT  
 <213> Shewanella oneidensis

<400> 77

Met Asn Lys Lys Lys His Leu Phe Ala Glu Asp Ser Phe Phe Leu Ser  
   1                  5                  10                  15

Arg Arg Lys Phe Met Ala Val Gly Ala Ala Phe Val Ala Ala Leu Ala  
           20                  25                  30

Ile Pro Ile Gly Trp Phe Thr Ser Lys Leu Glu Arg Arg Asn Glu Tyr  
           35                  40                  45

Ile Lys Ala Arg Ser Gln Gly Leu Tyr Lys Asp Asp Ser Leu Ala Lys  
       50                  55                  60

Thr Arg Val Ser His Ala Asn Pro Ala Val Glu Lys Tyr Tyr Lys Glu  
   65                  70                  75                  80

Phe Gly Gly Glu Pro Leu Gly His Met Ser His Glu Leu Leu His Thr  
           85                  90                  95

His Phe Val Asp Arg Thr Lys Leu Ser Ser  
           100                  105

<210> 78

<211> 504  
 <212> PRT  
 <213> Entamoeba histolytica

<400> 78

Met Ser Thr Gln Leu Thr Pro Leu Arg Asn Lys Ile Ile Ser Glu Val  
 1 5 10 15

Val Lys Cys Phe Lys Ser Gly Arg Phe Ile Glu Asp Ile Asp Lys Leu  
 20 25 30

Pro Thr Ile Leu Thr Asp Gly Asp Gly Trp Lys Pro Thr Ser Lys Phe  
 35 40 45

Val His Ser Arg Glu Gln Glu Gly Ile Tyr Arg Glu Lys Val Leu  
 50 55 60

Ser Val Leu Gly Phe Val Asp Gly Glu Tyr Asp Asp Ile Thr Pro Leu  
 65 70 75 80

His Val Tyr Ala Gln Lys Ala Leu Glu Arg Thr Ser Leu His Glu Pro  
 85 90 95

Val Phe Gly Ile Ser Gln Lys Gly Cys Asn Lys Cys His Phe Asn Gly  
 100 105 110

Tyr Phe Val Thr Gln Ala Cys Glu Gly Cys Thr Ser Arg Pro Cys Ser  
 115 120 125

Val Asn Cys Pro Lys Lys Cys Ile Ser Phe Gly Glu Asp Gly Arg Ala  
 130 135 140

Val Ile Asn Gln Asn Asn Cys Ile Lys Cys Gly Arg Cys Tyr Lys Phe  
 145 150 155 160

Cys Pro Tyr Gly Ala Ile Ile Ser Lys Ser Val Pro Cys Val Lys Ala  
 165 170 175

Cys Pro Cys Gly Ala Met Leu Asp Ser Pro Glu Gly Val Lys Thr Ile  
 180 185 190

Asp Phe Glu Lys Cys Ile Asn Cys Gly Gly Cys Met Arg Ala Cys Pro  
 195 200 205

Phe Gly Ala Ile Leu Pro Arg Ser Asn Leu Ile Asp Val Leu Lys Ile  
 210 215 220

Leu Pro Thr Lys Lys Val Val Ala Cys Pro Ala Pro Ser Ile Ala Ala  
 225 230 235 240

His Phe Gly Lys Tyr Asp Leu Ala Leu Val Ser Gly Gly Leu Ile Gln  
 245 250 255

Val Gly Phe Thr Ser Val Glu Asp Val Ser Tyr Gly Ala Asp Leu Cys  
 260 265 270  
 Ala Leu Asn Glu Ala Lys Glu Phe Glu Glu Arg Ile Val Lys Asn Lys  
 275 280 285  
 Lys Asp Phe Met Thr Thr Ser Cys Cys Pro Ala Tyr Ile Asn Ala Ile  
 290 295 300  
 Asn Lys His Met Pro Glu Leu Lys Glu Asn Val Ser His Thr Pro Thr  
 305 310 315 320  
 Pro Met His Phe Ala Thr Gln Ala Val Lys Asp Arg Asp Gln Glu Thr  
 325 330 335  
 Val Thr Val Phe Ile Gly Pro Cys Asn Ala Lys Arg Trp Glu Thr Leu  
 340 345 350  
 Gln Asp Ser Thr Thr Asp Tyr Cys Leu Thr Phe Asp Glu Ile Phe Gly  
 355 360 365  
 Leu Phe Glu Gly Ser Gly Ile Asp Leu Ser Lys Val Gln Pro Tyr Thr  
 370 375 380  
 Phe Val Asp Lys Ala His Lys Glu Gly Lys Ile Phe Ala Val Ser Gly  
 385 390 395 400  
 Gly Val Ala Ser Ala Val Ala Ser Leu Leu Pro Lys Glu Val Pro Asp  
 405 410 415  
 Gly Val Ile Lys Pro Thr Ile Ile Asp Gly Phe Ser Gln Glu Asn Phe  
 420 425 430  
 Lys Arg Leu Lys Asn Phe Lys Lys Asn Ile Thr Gly Asn Leu Val Glu  
 435 440 445  
 Val Met Val Cys Glu Gly Gly Cys Ala Tyr Gly Pro Gly Cys Pro Gly  
 450 455 460  
 Leu Asn Thr Pro Ala Thr Ser Ala Lys Ile Lys Ile Ala Val Asp Lys  
 465 470 475 480  
 Met Glu Ala His Pro Glu Gly Arg Trp Val Gly Leu Pro Asn Ser Gln  
 485 490 495  
 Ile Lys Pro Ile Lys Val Glu Asn  
 500

<210> 79  
 <211> 560  
 <212> PRT  
 <213> Cryptosporidium parvum  
 <400> 79

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Met Phe Ser Thr Ala Val Lys Leu Ala Asn Leu Asp Asp Tyr Leu Glu  
1 5 10 15

Ser Ser Gln Asp Cys Ile Val Ser Leu Leu Ser Asp Lys Asp Asp Thr  
20 25 30

Lys Pro Lys Ile Ala Val Met Arg Pro Ala Lys Ala Gln Gly Asn Lys  
35 40 45

Asp Asp Lys Lys Ser Gly Thr Ser Asp Lys Ala Thr Val Asn Val Ala  
50 55 60

Asp Cys Leu Ala Cys Ser Gly Cys Val Thr Ser Ala Glu Ala Lys Leu  
65 70 75 80

Leu Glu Asp Gln Asn Val Ser Glu Phe Met Asn Ile Leu Lys Gln Lys  
85 90 95

Arg Leu Thr Val Val Ser Ile Ser Asn Gln Ser Cys Ser Ser Phe Ala  
100 105 110

Cys His Leu Asn Cys Asp Leu Ile Thr Ile Gln Arg Lys Leu Ser Gly  
115 120 125

Leu Phe Lys His Ile Gly Ala Arg Phe Val Met Asn Ser Thr Ile Ser  
130 135 140

Glu Tyr Ile Ser Leu Leu Glu Thr Lys Tyr Glu Phe Ile Ser Arg Tyr  
145 150 155 160

Lys Ala Lys Ser Asp Leu Pro Met Ile Ile Ser His Cys Pro Gly Trp  
165 170 175

Ile Cys Tyr Ser Glu Lys Ser Leu Asn Ser Ser Val Leu Pro Leu Leu  
180 185 190

Ser Lys Val Arg Ser Ala Gln Gln Leu Gln Gly Ile Leu Ile Lys Thr  
195 200 205

Leu Thr Leu Glu Ile Tyr Asn Gln Leu Leu Phe Leu Tyr Lys Phe Arg  
210 215 220

Leu Ser Asn Ser Tyr Arg Thr Asn Met Asn Val Lys Ser Thr Phe Thr  
225 230 235 240

Gln Asn Asp Asn Phe Val Glu Gln Ser Asp Ile Phe His Val Ala Ile  
245 250 255

Met Pro Cys His Asp Lys Lys Leu Glu Ser Thr Arg Ser Ser Leu Ser  
260 265 270

Leu Lys Ser Ser Asp Lys Asn Ser Ser Cys Pro Glu Val Asp Ile Val

Leu Ala Thr Ser Glu Val Gly Glu Ile Ile Lys Leu Ala Gly Phe Asn  
290 295 300

Ser Leu Leu Asp Val Pro Glu Ala Pro Leu Asp Asn Leu Trp Leu Asn  
305 310 315 320

Gln Asn Phe Gln Ile Thr Lys Lys His Asn Leu Ser Leu Leu Ile Thr  
325 330 335

Glu Asn Tyr Val Ser Asn Gln Ile Leu Asn Gln Phe Ser Trp Leu Ile  
340 345 350

Pro Ser Tyr Phe Asn Ser Asn Ser Gly Gly Phe Cys Glu Tyr Ile Ile  
355 360 365

Arg Ser Ala Ile Lys Glu Leu Ala Gly Asp His Ile Asp Asn Lys Val  
370 375 380

Gln Leu Pro Phe Asn Lys Leu Lys Asn Asp Ile Leu Glu Ala Lys Tyr  
385 390 395 400

Ile Lys Asn Asn Val Glu Leu Asn Tyr Cys Leu Ala Tyr Gly Phe Arg  
405 410 415

Ala Ile Gln Ser Ile Ser Arg Lys Leu Asn Leu Gln Lys Asn Ala Ser  
420 425 430

Gln Asn Thr Gln Tyr Lys Gln Ser Val Val Asn His Val Asn Tyr His  
435 440 445

Leu Ile Glu Ala Met Ala Cys Pro Thr Gly Cys Val Ser Gly Gly Gly  
450 455 460

Gln Ile Leu Ser Gln Asn Asp Gln Asn Asp Asp Asn Ser Asp Leu Asn  
465 470 475 480

Lys Leu Arg Lys Asn Ile Lys Phe Ile Asp Glu Val Gln Glu Ala Leu  
485 490 495

Tyr Lys Gly Ile Asn Leu Asn Lys Asn Gln Glu Val Ile Leu Pro Asp  
500 505 510

Glu Ile Pro Ile Val Asn Ile Leu Tyr Glu Tyr Leu Ile His Ile Asp  
515 520 525

Lys Gln Ile Asp Arg Ser Ser Gly Leu Lys Leu Pro Phe Leu Arg Asn  
530 535 540

Asp Phe Val Ser Ile Asn Glu Val Pro Thr Ala Ser Ser Leu Lys Trp  
545 550 555 560

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<210> 80  
 <211> 469  
 <212> PRT  
 <213> Kluyveromyces lactis

<400> 80

Met Ser Ala Leu Leu Arg Asp Ala Asp Leu Asn Asp Phe Ile Ser Pro  
 1 5 10 15

Gly Leu Ala Cys Val Lys Pro Ala Gln Pro Gln Lys Val Glu Lys Lys  
 20 25 30

Pro Ser Phe Glu Val Glu Val Gly Ile Glu Ser Ser Glu Pro Glu Lys  
 35 40 45

Val Ser Ile Ser Leu Gln Asp Cys Leu Ala Cys Ala Gly Cys Ile Thr  
 50 55 60

Ser Ser Glu Glu Ile Leu Leu Ser Lys Gln Ser His Lys Val Phe Leu  
 65 70 75 80

Glu Lys Trp Ser Glu Leu Glu Glu Leu Asp Glu Arg Ser Leu Ala Val  
 85 90 95

Ser Ile Ser Pro Gln Cys Arg Leu Ser Leu Ala Asp Tyr Tyr Ser Met  
 100 105 110

Cys Leu Ala Asp Leu Asp Arg Cys Phe Gln Asn Phe Met Lys Thr Lys  
 115 120 125

Phe Asn Ala Lys Tyr Val Val Gly Thr Gln Phe Gly Arg Ser Ile Ser  
 130 135 140

Ile Ser Arg Ile Asn Ala Thr Leu Lys Asp Arg Val Pro Glu Asn Glu  
 145 150 155 160

Gly Pro Leu Leu Cys Ser Val Cys Pro Gly Phe Val Leu Tyr Ala Glu  
 165 170 175

Lys Thr Lys Pro Glu Leu Ile Pro His Met Leu Asp Val Lys Ser Pro  
 180 185 190

Gln Gln Ile Thr Gly Asn Leu Leu Lys Gln Ala Asp Pro Thr Cys Tyr  
 195 200 205

His Leu Ser Ile Met Pro Cys Phe Asp Lys Lys Leu Glu Ala Ser Arg  
 210 215 220

Glu Glu Cys Glu Lys Glu Val Asp Cys Val Ile Thr Pro Lys Gln Phe  
 225 230 235 240

Val Ala Met Leu Gly Asp Leu Ser Ile Asp Phe Lys Ser Tyr Met Thr  
 245 250 255



Glu Tyr Asp Ser Ser Lys Glu Leu Cys Pro Ser Gly Trp Asp Tyr Lys  
260 265 270

Leu His Trp Leu Ser Asn Glu Gly Ser Ser Ser Gly Gly Tyr Ala Tyr  
275 280 285

Gln Tyr Leu Leu Ser Leu Gln Ser Ser Asn Pro Glu Ser Asp Ile Ile  
290 295 300

Thr Ile Glu Gly Lys Asn Ser Asp Val Thr Glu Tyr Arg Leu Val Ser  
305 310 315 320

Lys Ser Lys Gly Val Ile Ala Ser Ser Ser Glu Val Tyr Gly Phe Arg  
325 330 335

Asn Ile Gln Asn Leu Val Arg Lys Leu Ser Gln Ser Ala Ser Val Lys  
340 345 350

Lys Arg Gly Ile Lys Val Lys Arg Arg Gly Gln Ser Val Leu Lys Ser  
355 360 365

Gly Glu Thr Ser Glu Lys Thr Thr Lys Val Leu Thr Ala Asp Pro Ala  
370 375 380

Lys Thr Asp Phe Val Glu Val Met Ala Cys Pro Ser Gly Cys Ile Asn  
385 390 395 400

Gly Gly Gly Leu Leu Asn Glu Glu Lys Asn Ala Asn Arg Arg Lys Gln  
405 410 415

Leu Ala Gln Asp Leu Ser Leu Ala Tyr Thr Lys Val His Ser Val Asn  
420 425 430

Ile Pro Asp Ile Val His Ala Tyr Asp Asp Lys Ser Asn Asp Phe Lys  
435 440 445

Tyr Asn Leu Arg Val Ile Glu Pro Ser Thr Ser Ser Asp Val Val Ala  
450 455 460

Val Gly Asn Thr Trp  
465

<210> 81

<211> 365

<212> PRT

<213> Encephalitozoon cuniculi

<400> 81

Met Asp Ala Leu Ile Arg Pro Pro Met Ser Phe Phe Ala Asp Leu Pro  
1 5 10 15

Lys Asp Asn Lys Lys Cys Ile Lys Ile Gly Ser Pro Leu Ala Leu Ser

Leu Ser Asp Cys Leu Ala Cys Ser Gly Cys Val Ser Ala Asp Glu Ala  
 35 40 45  
 Gly Ala Leu Ser Glu Asp Leu Ser Phe Val Leu Asp Leu Ser Pro Gln  
 50 55 60  
 Thr Ser Phe Val Leu Ser Pro Gln Ser Lys Ile Asn Ile Phe Asn Leu  
 65 70 75 80  
 Tyr Arg Glu Asp Gly Met Glu Tyr Arg Glu Phe Glu Ala Val Leu Ser  
 85 90 95  
 Ser Phe Leu Arg Ser Lys Phe Asn Ile His Arg Ile Val Asp Thr Ser  
 100 105 110  
 Tyr Leu Arg Ser Lys Ile Tyr Glu Glu Thr Tyr Arg Glu Tyr Met Ala  
 115 120 125  
 Thr Asn His Leu Ile Val Ser Ala Cys Pro Gly Val Val Thr Tyr Ile  
 130 135 140  
 Glu Arg Thr Ala Pro Tyr Leu Ile Gly Tyr Leu Ser Arg Val Lys Ser  
 145 150 155 160  
 Pro Gln Gln Met Ala Phe Ser Leu Val Lys Gly Ser Arg Thr Val Ser  
 165 170 175  
 Val Met Pro Cys Gln Asp Lys Lys Leu Glu Asn Gly Arg Asp Gly Val  
 180 185 190  
 Lys Phe Asp Phe Ile Leu Thr Thr Arg Gly Phe Cys Lys Ala Leu Asp  
 195 200 205  
 Ser Leu Gly Phe Arg Arg Pro Ala Arg Ala Ser Gly Lys Ser Leu Cys  
 210 215 220  
 Ser Met Glu Glu Ala Glu Thr Thr Gln Trp Asn Ile Gly Thr Ser Ser  
 225 230 235 240  
 Gly Gly Tyr Ala Glu Phe Ile Leu Gly Lys His Cys Val Val Glu Thr  
 245 250 255  
 Arg Glu Ile Arg Asn Gly Ile Lys Glu His Leu Leu Asp Asp Gly Arg  
 260 265 270  
 Thr Ile Ser Gln Ile Thr Gly Leu Glu Asn Ser Ile Asn Tyr Phe Lys  
 275 280 285  
 Ser Ser Lys Thr Lys Gly Pro Arg His Lys Met Thr Glu Ile Phe Leu  
 290 295 300

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Cys Lys Asn Gly Cys Ile Gly Gly Pro Gly Gln Glu Arg Val Asn Asp  
305 310 315 320

Val Glu Met Asp Ile Arg Glu Tyr Asp Arg Asn Gly Arg Glu Gln Pro  
325 330 335

Arg Ile Phe Tyr Ser Ser Pro Gly Leu Glu Glu Lys Arg Val Phe Arg  
340 345 350

Glu Val Lys Ala Lys Arg Val Asp Leu Arg Val Asp Trp  
355 360 365

<210> 82  
<211> 127  
<212> PRT  
<213> Tritrichomonas foetus

<220>  
<221> misc\_feature  
<222> (85)..(85)  
<223> Xaa can be any naturally occurring amino acid

<220>  
<221> misc\_feature  
<222> (124)..(124)  
<223> Xaa can be any naturally occurring amino acid

<400> 82

Met Cys Ile Lys Ala Cys Asn Ser Val Ala Gly Gln Gly Val Leu Lys  
1 5 10 15

Leu Val Lys Val Gly Asn Lys Lys Leu Val Ser Thr Lys Ser Gly Lys  
20 25 30

Pro Leu Gln Glu Thr Asn Cys Ile Lys Cys Gly Gln Cys Thr Leu Val  
35 40 45

Cys Gly Pro Gly Ala Leu Thr Gln Lys Asp Ala Ile Gln Thr Val Ser  
50 55 60

Glu Val Leu Lys Asn Pro Gly Asp Lys Val Leu Val Cys Gln Thr Ala  
65 70 75 80

Pro Ala Ile Arg Xaa Asn Leu Ala Asp Gly Leu Gly Met Pro Ala Gly  
85 90 95

Ser Ile Ile Thr Gly Lys Met Val Thr Ala Leu Lys Met Leu Gly Phe  
100 105 110

Lys Tyr Val Phe Asp Thr Asn Phe Gly Thr Asp Xaa Thr Ile Gly  
115 120 125

<210> 83  
<211> 449  
<212> PRT

&lt;213&gt; Scenedesmus obliquus

&lt;400&gt; 83

Met Pro Glu Trp Gln Pro Gly Gly Arg Tyr Ala Val Ser Val Arg Pro  
 1 5 10 15

Pro Val Asn Arg Arg Ala Val Val Ala Ala Glu Arg Arg Arg Leu Val  
 20 25 30

Val Arg Ala Ala Gly Pro Thr Ala Glu Cys Asp Cys Pro Pro Ala Pro  
 35 40 45

Ala Pro Lys Ala Pro His Trp Gln Gln Thr Leu Asp Glu Leu Ala Lys  
 50 55 60

Pro Lys Glu Gln Arg Lys Val Met Ile Ala Gln Ile Ala Pro Ala Val  
 65 70 75 80

Arg Val Ala Ile Ala Glu Thr Met Gly Leu Asn Pro Gly Asp Val Thr  
 85 90 95

Val Gly Gln Met Val Thr Gly Leu Arg Met Leu Gly Phe Asp Tyr Val  
 100 105 110

Phe Asp Thr Leu Phe Gly Ala Asp Leu Thr Ile Met Glu Glu Gly Thr  
 115 120 125

Glu Leu Arg His Arg Leu Gln Asp His Leu Glu Gln His Pro Asn Lys  
 130 135 140

Glu Glu Pro Leu Pro Met Phe Thr Ser Cys Cys Pro Gly Trp Val Ala  
 145 150 155 160

Met Val Glu Lys Ser Asn Pro Glu Leu Ile Pro Tyr Leu Ser Ser Cys  
 165 170 175

Lys Ser Pro Gln Met Met Leu Gly Ala Val Ile Lys Asn Tyr Phe Ala  
 180 185 190

Ala Glu Ala Gly Ala Lys Pro Glu Asp Ile Cys Asn Val Ser Val Met  
 195 200 205

Pro Cys Val Arg Lys Gln Gly Glu Ala Asp Arg Glu Trp Phe Asn Thr  
 210 215 220

Thr Gly Ala Gly Gly Ala Asn Val Asp His Val Met Thr Thr Ala Glu  
 225 230 235 240

Leu Gly Lys Ile Phe Val Glu Arg Gly Ile Lys Leu Asn Asp Leu Gln  
 245 250 255

Glu Ser Pro Phe Asp Asn Pro Val Gly Glu Gly Ser Gly Gly Gly Val  
 260 265 270

Leu Phe Gly Thr Thr Gly Gly Val Met Glu Ala Ala Leu Arg Thr Val  
275 280 285

Tyr Glu Val Val Thr Gln Lys Pro Leu Asp Arg Ile Val Phe Glu Asp  
290 295 300

Val Arg Gly Leu Glu Gly Ile Lys Glu Ser Thr Leu His Leu Thr Pro  
305 310 315 320

Gly Pro Thr Ser Pro Phe Lys Ala Phe Ala Gly Ala Asp Gly Thr Gly  
325 330 335

Ile Thr Leu Asn Ile Ala Val Ala Asn Gly Leu Gly Asn Ala Lys Lys  
340 345 350

Leu Ile Lys Gln Leu Ala Ala Gly Glu Ser Lys Tyr Asp Phe Ile Glu  
355 360 365

Val Met Ala Cys Pro Gly Gly Cys Ile Gly Gly Gly Gly Gln Pro Arg  
370 375 380

Ser Ala Asp Lys Gln Ile Leu Gln Lys Arg Gln Ala Ala Met Tyr Asp  
385 390 395 400

Leu Asp Glu Arg Ala Val Ile Arg Arg Ser His Glu Asn Pro Leu Ile  
405 410 415

Gly Ala Leu Tyr Glu Lys Phe Leu Gly Glu Pro Asn Gly His Lys Ala  
420 425 430

His Glu Leu Leu His Thr His Tyr Val Ala Gly Gly Val Pro Asp Glu  
435 440 445

Lys

<210> 84  
<211> 477  
<212> PRT  
<213> Anopheles gambiae

<400> 84

Ser Arg Phe Ser Ser Ala Leu Gln Leu Thr Asp Leu Asp Asp Phe Ile  
1 5 10 15

Thr Pro Ser Gln Glu Cys Ile Lys Pro Val Lys Ile Glu Thr Ser Lys  
20 25 30

Ser Lys Thr Gly Ala Lys Ile Thr Ile Gln Glu Asp Gly Ser Tyr Val  
35 40 45

Gln Glu Ser Ser Ser Gly Ile Gln Lys Leu Glu Lys Val Glu Ile Thr  
Page 145

50

55

60

Leu Ala Asp Cys Leu Ala Cys Ser Gly Cys Ile Thr Ser Ala Glu Gly  
65 70 75 80

Val Leu Ile Ser Gln Gln Ser Gln Glu Glu Leu Leu Arg Val Met Asn  
85 90 95

Ala Asn Asn Leu Ala Lys Leu Asn Asn Gln Arg Asp Glu Ile Lys Phe  
100 105 110

Val Val Phe Thr Val Ser Gln Gln Pro Ile Leu Ser Leu Ala Arg Lys  
115 120 125

Tyr Asn Leu Thr Pro Glu Asp Thr Phe Glu His Ile Ala Gly Tyr Phe  
130 135 140

Lys Lys Leu Gly Ala Asp Met Val Val Asp Thr Lys Ile Ala Asp Asp  
145 150 155 160

Leu Ala Leu Ile Glu Cys Arg Asn Glu Phe Ile Glu Arg Tyr Asn Thr  
165 170 175

Asn Arg Lys Leu Leu Pro Met Leu Ala Ser Ser Cys Pro Gly Trp Val  
180 185 190

Cys Tyr Ala Glu Lys Thr His Gly Asn Phe Ile Leu Pro Tyr Ile Ala  
195 200 205

Thr Thr Arg Ser Pro Gln Gln Ile Met Gly Val Leu Val Lys Gln Tyr  
210 215 220

Leu Ala Lys Gln Leu Gln Thr Thr Gly Asp Arg Ile Tyr His Val Thr  
225 230 235 240

Val Met Pro Cys Tyr Asp Lys Lys Leu Glu Ala Ser Arg Glu Asp Phe  
245 250 255

Phe Ser Glu Val Glu Asn Ser Arg Asp Val Asp Cys Val Ile Thr Ser  
260 265 270

Ile Glu Ile Glu Gln Met Leu Asn Ser Leu Asp Leu Pro Ser Leu Gln  
275 280 285

Leu Val Glu Arg Cys Ala Ile Asp Trp Pro Trp Pro Thr Val Arg Pro  
290 295 300

Ser Ala Phe Val Trp Gly His Glu Ser Ser Gly Ser Gly Gly Tyr Ala  
305 310 315 320

Glu Tyr Ile Phe Lys Tyr Ala Ala Arg Lys Leu Phe Asn Val Gln Leu  
325 330 335

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Asp Thr Val Ala Phe Lys Pro Leu Arg Asn Asn Asp Met Arg Glu Ala  
 340 345 350  
 Val Leu Glu Gln Asn Gly Gln Val Leu Met Arg Phe Ala Ile Ala Asn  
 355 360 365  
 Gly Phe Arg Asn Ile Gln Asn Met Val Gln Lys Leu Lys Arg Gly Lys  
 370 375 380  
 Ser Thr Tyr Asp Tyr Val Glu Ile Met Ala Cys Pro Ser Gly Cys Leu  
 385 390 395 400  
 Asn Gly Gly Ala Gln Ile Arg Pro Glu Glu Gly Arg Ala Ala Arg Glu  
 405 410 415  
 Leu Thr Ala Glu Leu Glu Cys Met Tyr Arg Ser Leu Pro Gln Ser Thr  
 420 425 430  
 Pro Glu Asn Asp Cys Val Gln Thr Met Tyr Ala Thr Phe Phe Asp Ser  
 435 440 445  
 Glu Gly Asp Leu Asn Lys Arg Gln Ser Leu Leu His Thr Ser Tyr His  
 450 455 460  
 Gln Ile Glu Lys Ile Asn Ser Ala Leu Asn Ile Lys Trp  
 465 470 475  
 <210> 85  
 <211> 410  
 <212> PRT  
 <213> Shewanella oneidensis  
 <400> 85  
 Met Thr Thr Thr Thr Tyr Gln Pro Gly Glu Ile Gln Gly Leu Ile Lys  
 1 5 10 15  
 Ile Asn Ala Ser Lys Cys Lys Gly Cys Asp Ala Cys Lys Gln Phe Cys  
 20 25 30  
 Pro Thr His Ala Ile Asn Gly Ala Ser Gly Ala Val His Ser Ile Asp  
 35 40 45  
 Glu Asp Lys Cys Leu Ser Cys Gly Gln Cys Leu Ile Asn Cys Pro Phe  
 50 55 60  
 Ser Ala Ile Glu Glu Thr His Ser Ala Leu Glu Thr Val Ile Lys Lys  
 65 70 75 80  
 Leu Ala Asp Lys Asn Thr Thr Val Val Gly Ile Ile Ala Pro Ala Val  
 85 90 95  
 Arg Val Ala Ile Gly Glu Glu Phe Gly Leu Gly Thr Gly Glu Leu Val  
 100 105 110

Thr Gly Lys Leu Tyr Gly Ala Met Asn Gln Ala Gly Phe Lys Ile Phe  
 115 120 125  
 Asp Cys Asn Phe Ala Ala Asp Leu Thr Ile Met Glu Glu Gly Ser Glu  
 130 135 140  
 Phe Ile His Arg Leu His Ala Asn Val Lys Gly Glu Ala Asn Ala Gly  
 145 150 155 160  
 Pro Leu Pro Gln Phe Thr Ser Cys Cys Pro Gly Trp Val Arg Tyr Leu  
 165 170 175  
 Glu Thr Arg Tyr Pro Ala Leu Leu Pro Asn Leu Ser Thr Ala Lys Ser  
 180 185 190  
 Pro Gln Gln Met Ala Gly Thr Val Ala Lys Thr Tyr Gly Ala Lys Val  
 195 200 205  
 Tyr Gln Met Gln Pro Glu Asn Ile Phe Thr Val Ser Val Met Pro Cys  
 210 215 220  
 Thr Ser Lys Lys Leu Glu Ala Ser Arg Pro Glu Phe Asn Ser Ala Trp  
 225 230 235 240  
 Gln Tyr His Gln Glu His Gly Ala Asn Ser Pro Ser Tyr Gln Asp Ile  
 245 250 255  
 Asp Ala Val Leu Thr Thr Arg Glu Met Ala Gln Leu Leu Lys Leu Leu  
 260 265 270  
 Asp Ile Asp Leu Ala Asn Thr Ala Glu Tyr Gln Gly Asp Ser Leu Phe  
 275 280 285  
 Ser Glu Tyr Thr Gly Ala Gly Thr Ile Phe Gly Thr Thr Gly Gly Val  
 290 295 300  
 Met Glu Ala Ala Leu Arg Thr Ala His Lys Val Leu Thr Gly Thr Glu  
 305 310 315 320  
 Met Ala Lys Leu Glu Phe Glu Pro Val Arg Gly Leu Lys Gly Val Lys  
 325 330 335  
 Ser Ala Ser Val Ser Leu Phe Asp Thr Glu Leu Asn Gln Asp Val Thr  
 340 345 350  
 Val Asn Val Ala Val Val His Asp Met Gly Asn Asn Ile Glu Pro Val  
 355 360 365  
 Leu Arg Asp Val Met Ala Gly Thr Ser Pro Tyr His Phe Ile Glu Val  
 370 375 380



Met Asn Cys Ala Gly Gly Cys Val Asn Gly Gly Gly Gln Pro Ile Glu  
 385 390 395 400

Gly Lys Gly Ser Ser Trp Leu Gly Asn Ile  
 405 410

<210> 86  
 <211> 606  
 <212> PRT  
 <213> Clostridium thermocellum

<400> 86

Met Ala Phe Val Trp Arg Asn Val Arg Ser Arg Pro Phe Pro Lys Lys  
 1 5 10 15

Pro Asn Gly Arg Gly Cys Glu Lys Met Gln Met Val Asn Val Thr Ile  
 20 25 30

Asp Asn Cys Lys Ile Gln Val Pro Ala Asn Tyr Thr Val Leu Glu Ala  
 35 40 45

Ala Lys Gln Ala Asn Ile Asp Ile Pro Thr Leu Cys Phe Leu Lys Asp  
 50 55 60

Ile Asn Glu Val Gly Ala Cys Arg Met Cys Val Val Glu Val Lys Gly  
 65 70 75 80

Ala Arg Ser Leu Gln Ala Ala Cys Val Tyr Pro Val Ser Glu Gly Leu  
 85 90 95

Glu Val Tyr Thr Gln Thr Pro Ala Val Arg Glu Ala Arg Lys Val Thr  
 100 105 110

Leu Glu Leu Ile Leu Ser Asn His Glu Lys Lys Cys Leu Thr Cys Val  
 115 120 125

Arg Ser Glu Asn Cys Glu Leu Gln Arg Leu Ala Lys Asp Leu Asn Val  
 130 135 140

Lys Asp Ile Arg Phe Glu Gly Glu Met Ser Asn Leu Pro Ile Asp Asp  
 145 150 155 160

Leu Ser Pro Ser Val Val Arg Asp Pro Asn Lys Cys Val Leu Cys Arg  
 165 170 175

Arg Cys Val Ser Met Cys Lys Asn Val Gln Thr Val Gly Ala Ile Asp  
 180 185 190

Val Thr Glu Arg Gly Phe Arg Thr Thr Val Ser Thr Ala Phe Asn Lys  
 195 200 205

Pro Leu Ser Glu Val Pro Cys Val Asn Cys Gly Gln Cys Ile Asn Val  
 210 215 220

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Cys Pro Val Gly Ala Leu Arg Glu Lys Asp Asp Ile Asp Lys Val Trp  
 225 230 235 240  
 Glu Ala Leu Ala Asn Pro Glu Leu His Val Val Val Gln Thr Ala Pro  
 245 250 255  
 Ala Val Arg Val Ala Leu Gly Glu Glu Phe Gly Met Pro Ile Gly Ser  
 260 265 270  
 Arg Val Thr Gly Lys Met Val Ala Ala Leu Ser Arg Leu Gly Phe Lys  
 275 280 285  
 Lys Val Phe Asp Thr Asp Thr Ala Ala Asp Leu Thr Ile Met Glu Glu  
 290 295 300  
 Gly Thr Glu Leu Ile Asn Arg Ile Lys Asn Gly Gly Lys Leu Pro Leu  
 305 310 315 320  
 Ile Thr Ser Cys Ser Pro Gly Trp Ile Lys Phe Cys Glu His Asn Tyr  
 325 330 335  
 Pro Glu Phe Leu Asp Asn Leu Ser Ser Cys Lys Ser Pro His Glu Met  
 340 345 350  
 Phe Gly Ala Val Leu Lys Ser Tyr Tyr Ala Gln Lys Asn Gly Ile Asp  
 355 360 365  
 Pro Ser Lys Val Phe Val Val Ser Ile Met Pro Cys Thr Ala Lys Lys  
 370 375 380  
 Phe Glu Ala Gln Arg Pro Glu Leu Ser Ser Thr Gly Tyr Pro Asp Val  
 385 390 395 400  
 Asp Val Val Leu Thr Thr Arg Glu Leu Ala Arg Met Ile Lys Glu Thr  
 405 410 415  
 Gly Ile Asp Phe Asn Ser Leu Pro Asp Lys Gln Phe Asp Asp Pro Met  
 420 425 430  
 Gly Glu Ala Ser Gly Ala Gly Val Ile Phe Gly Ala Thr Gly Gly Val  
 435 440 445  
 Met Glu Ala Ala Ile Arg Thr Val Gly Glu Leu Leu Ser Gly Lys Pro  
 450 455 460  
 Ala Asp Lys Ile Glu Tyr Thr Glu Val Arg Gly Leu Asp Gly Ile Lys  
 465 470 475 480  
 Glu Ala Ser Ile Glu Leu Asp Gly Phe Thr Leu Lys Ala Ala Val Ala  
 485 490 495  
 His Gly Leu Gly Asn Ala Arg Lys Leu Leu Asp Lys Ile Lys Ala Gly

Glu Ala Asp Tyr His Phe Ile Glu Ile Met Ala Cys Pro Gly Gly Cys  
515 520 525

Ile Asn Gly Gly Gly Gln Pro Ile Gln Pro Ser Ser Val Arg Asn Trp  
530 535 540

Lys Asp Ile Arg Cys Glu Arg Ala Lys Ala Ile Tyr Glu Glu Asp Glu  
545 550 555 560

Ser Leu Pro Ile Arg Lys Ser His Glu Asn Pro Lys Ile Lys Met Leu  
565 570 575

Tyr Glu Glu Phe Phe Gly Glu Pro Gly Ser His Lys Ala His Glu Leu  
580 585 590

Leu His Thr His Tyr Glu Lys Arg Glu Asn Tyr Pro Val Lys  
595 600 605

<210> 87  
<211> 279  
<212> PRT  
<213> Desulfitobacterium hafniense

<400> 87

Met Thr Met Gly Gln Leu Arg Ala Ala Leu Lys His Leu Gly Phe Tyr  
1 5 10 15

Gly Met Ile Glu Val Ala Leu Phe Ala Asp Val Leu Ser Leu Lys Glu  
20 25 30

Ala Leu Glu Phe Asp Lys His Val Gln Thr Asp Lys Asp Phe Val Leu  
35 40 45

Thr Ser Cys Cys Cys Pro Ile Trp Val Gly Met Val Lys Arg Val Tyr  
50 55 60

Asp Thr Leu Val Pro His Ile Ser Pro Ser Val Ser Pro Met Val Ala  
65 70 75 80

Cys Gly Arg Gly Ile Lys Arg Leu His Pro Asp Ala Lys Thr Val Phe  
85 90 95

Ile Gly Pro Cys Ile Ala Lys Lys Ala Glu Ala Lys Glu Pro Asp Ile  
100 105 110

Arg Asp Ala Val Asp Ala Val Leu Thr Phe His Glu Leu Lys Gln Ile  
115 120 125

Phe Glu Ala Thr Asp Ile Glu Pro Ser Glu Met Glu Asp Ile Pro Ser  
130 135 140

Glu His Ser Ser Thr Ser Gly Arg Ile Tyr Ala Arg Thr Gly Gly Val  
 145 150 155 160

Ser Lys Ser Ile Ser Asp Thr Leu Asn Arg Ile Arg Pro Asp Lys Pro  
 165 170 175

Val Lys Ile Lys Ser Ile Gln Ala Asn Gly Ile Lys Glu Cys Lys Ala  
 180 185 190

Leu Leu Asn Asp Ile Met Asn Asn Glu Ile Lys Ala Asn Phe Tyr Glu  
 195 200 205

Gly Met Gly Cys Pro Gly Gly Cys Val Gly Gly Pro Lys Ala Ile Val  
 210 215 220

Asp Val Asp Arg Gly Thr Glu Phe Val Asn Lys Tyr Gly Ala Glu Ala  
 225 230 235 240

Asp Ala Leu Thr Pro Ala Asp Asn Gln His Val Leu Glu Leu Leu Lys  
 245 250 255

Gln Leu Gly Ile Asp Ser Val Glu Glu Leu Leu Gly Gly Glu Ser Ala  
 260 265 270

Ala Ile Phe Gln Arg Asp Phe  
 275

<210> 88  
 <211> 505  
 <212> PRT  
 <213> C. reinhardtii

<400> 88

Met Ala Leu Gly Leu Arg Ala Glu Leu Arg Ala Gly Gln Ala Val Ala  
 1 5 10 15

Cys Ala Arg Arg Thr Asn Ala Pro Ala His Pro Ala Ala Val Val Pro  
 20 25 30

Val Leu Pro Ser Arg Gly Asp Lys Phe Phe Asn Leu Ser Gln Lys Val  
 35 40 45

Pro Ser Ser Gln Pro Ala Arg Gly Ser Thr Ile Arg Val Ala Ala Thr  
 50 55 60

Ala Thr Asp Ala Val Pro His Trp Lys Leu Ala Leu Glu Glu Leu Asp  
 65 70 75 80

Lys Pro Lys Asp Gly Gly Arg Lys Val Leu Ile Ala Gln Val Ala Pro  
 85 90 95

Ala Val Arg Val Ala Ile Ala Glu Ser Phe Gly Leu Ala Pro Gly Ala  
 100 105 110

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Val Ser Pro Gly Lys Leu Ala Ala Gly Leu Arg Ala Leu Gly Phe Asp  
 115 120 125  
 Gln Val Phe Asp Thr Leu Phe Ala Ala Asp Leu Thr Ile Met Glu Glu  
 130 135 140  
 Gly Thr Glu Leu Leu His Arg Leu Lys Glu His Leu Glu Ala His Pro  
 145 150 155 160  
 His Ser Asp Glu Pro Leu Pro Met Phe Thr Ser Cys Cys Pro Gly Trp  
 165 170 175  
 Val Ala Met Met Glu Lys Ser Tyr Pro Glu Leu Ile Pro Phe Val Ser  
 180 185 190  
 Ser Cys Lys Ser Pro Gln Met Met Met Gly Ala Met Val Lys Thr Tyr  
 195 200 205  
 Leu Ser Glu Lys Gln Gly Ile Pro Ala Lys Asp Ile Val Met Val Ser  
 210 215 220  
 Val Met Pro Cys Val Arg Lys Gln Gly Glu Ala Asp Arg Glu Trp Phe  
 225 230 235 240  
 Cys Val Ser Glu Pro Gly Val Arg Asp Val Asp His Val Ile Thr Thr  
 245 250 255  
 Ala Glu Leu Gly Asn Ile Phe Lys Glu Arg Gly Ile Ile Leu Pro Glu  
 260 265 270  
 Leu Pro Asp Ser Asp Trp Asp Gln Pro Leu Gly Leu Gly Ser Gly Ala  
 275 280 285  
 Gly Val Leu Phe Gly Thr Thr Gly Gly Val Met Glu Ala Ala Val Arg  
 290 295 300  
 Thr Ala Tyr Glu Ile Val Thr Lys Glu Pro Leu Pro Arg Leu Asn Leu  
 305 310 315 320  
 Ser Glu Val Arg Gly Leu Asp Gly Ile Lys Glu Ala Ser Val Thr Leu  
 325 330 335  
 Val Pro Ala Pro Gly Ser Lys Phe Ala Glu Leu Val Ala Ala Arg Leu  
 340 345 350  
 Ala His Lys Val Glu Glu Ala Ala Ala Glu Ala Ala Ala Val  
 355 360 365  
 Glu Gly Ala Val Lys Pro Pro Ile Ala Tyr Asp Gly Gly Gln Gly Phe  
 370 375 380  
 Ser Thr Asp Asp Gly Lys Gly Gly Leu Lys Leu Arg Val Ala Val Ala



Gln Val Phe Asp Thr Leu Phe Ala Ala Asp Leu Thr Ile Met Glu Glu  
 130 135 140  
 Gly Thr Glu Leu Leu His Arg Leu Lys Glu His Leu Glu Ala His Pro  
 145 150 155 160  
 His Ser Asp Glu Pro Leu Pro Met Phe Thr Ser Cys Cys Pro Gly Trp  
 165 170 175  
 Val Ala Met Met Glu Lys Ser Tyr Pro Glu Leu Ile Pro Phe Val Ser  
 180 185 190  
 Ser Cys Lys Ser Pro Gln Met Met Met Gly Ala Met Val Lys Thr Tyr  
 195 200 205  
 Leu Ser Glu Lys Gln Gly Ile Pro Ala Lys Asp Ile Val Met Val Ser  
 210 215 220  
 Val Met Pro Cys Val Arg Lys Gln Gly Val Ala Asp Arg Glu Trp Phe  
 225 230 235 240  
 Cys Val Ser Glu Pro Gly Val Arg Asp Val Asp His Val Ile Thr Thr  
 245 250 255  
 Ala Glu Leu Gly Asn Ile Phe Lys Glu Arg Gly Ile Ile Leu Pro Glu  
 260 265 270  
 Leu Pro Asp Ser Asp Trp Asp Gln Pro Leu Gly Leu Gly Ser Gly Ala  
 275 280 285  
 Gly Val Leu Phe Gly Thr Thr Gly Gly Val Met Glu Ala Ala Val Arg  
 290 295 300  
 Thr Ala Tyr Glu Ile Val Thr Lys Glu Pro Leu Pro Arg Leu Asn Leu  
 305 310 315 320  
 Ser Glu Val Arg Gly Leu Asp Gly Ile Lys Glu Ala Ser Val Thr Leu  
 325 330 335  
 Val Pro Ala Pro Gly Ser Lys Phe Ala Glu Leu Val Ala Ala Arg Leu  
 340 345 350  
 Ala His Lys Val Glu Glu Ala Ala Ala Ala Glu Ala Ala Ala Val  
 355 360 365  
 Glu Gly Ala Val Lys Pro Pro Ile Ala Tyr Asp Gly Gly Gln Gly Phe  
 370 375 380  
 Ser Thr Asp Asp Gly Lys Gly Gly Leu Lys Leu Arg Val Ala Val Ala  
 385 390 395 400  
 Asn Gly Leu Gly Asn Ala Lys Lys Leu Ile Gly Lys Met Val Ser Gly  
 405 410 415

Glu Ala Lys Tyr Asp Phe Val Glu Ile Met Ala Cys Pro Ala Gly Cys  
 420 425 430

Val Gly Gly Gly Gly Gln Pro Arg Ser Thr Asp Lys Gln Ile Thr Gln  
 435 440 445

Lys Arg Gln Ala Ala Leu Tyr Asp Leu Asp Glu Arg Asn Thr Leu Arg  
 450 455 460

Arg Ser His Glu Asn Glu Ala Val Asn Gln Leu Tyr Lys Glu Phe Leu  
 465 470 475 480

Gly Glu Pro Leu Ser His Arg Ala His Glu Leu Leu His Thr His Tyr  
 485 490 495

Val Pro Gly Gly Ala Glu Ala Asp Ala  
 500 505

<210> 90  
 <211> 608  
 <212> PRT  
 <213> T. maritima

<400> 90

Met Arg Arg Phe Phe Lys Asn Asn Leu Arg Asn Leu Ser Gln Asn Gly  
 1 5 10 15

Glu Thr Asn Ser Val Arg Arg Cys Phe Ala Leu Ala Asp Val Thr Val  
 20 25 30

Val Ile Asn Gly Arg Thr Leu Thr Val Pro Asp Asn Leu Thr Val Ile  
 35 40 45

Glu Ala Cys Glu Lys Ala Gly Ile Glu Ile Pro Ala Leu Cys His His  
 50 55 60

Pro Arg Leu Gly Glu Ser Ile Gly Ala Cys Arg Val Cys Val Val Glu  
 65 70 75 80

Val Glu Gly Ala Arg Asn Leu Gln Pro Ala Cys Val Thr Lys Val Arg  
 85 90 95

Asp Gly Met Val Ile Lys Thr Ser Ser Asp Arg Val Lys Thr Ala Arg  
 100 105 110

Lys Phe Asn Leu Ala Leu Leu Leu Ser Glu His Pro Asn Asp Cys Met  
 115 120 125

Thr Cys Glu Ala Asn Gly Arg Cys Glu Phe Gln Asp Leu Ile Tyr Lys  
 130 135 140

Tyr Asp Val Glu Pro Ile Phe Gly Tyr Gly Thr Lys Glu Gly Leu Val



145		150		155		160
Asp	Arg	Ser	Ser	Pro	Ala	Ile
				165		
				170		
Asp	Arg	Ser	Ser	Pro	Ala	Ile
				165		175
Cys	Gln	Arg	Cys	Val	Arg	Ala
			180			
				185		
				190		
Tyr	Ser	Met	Val	Glu	Arg	Gly
		195				200
						205
Asp	Met	Pro	Val	Tyr	Glu	Thr
	210					215
						220
Ala	Phe	Cys	Pro	Thr	Gly	Ala
					230	
						235
Val	Leu	Glu	Glu	Leu	Glu	Lys
				245		
						250
						255
Ala	Pro	Ser	Val	Arg	Val	Ala
			260			
						265
Gly	Thr	Ile	Ser	Thr	Gly	Gln
		275				280
						285
Phe	Asp	Tyr	Val	Phe	Asp	Thr
	290					295
						300
Glu	Glu	Gly	Ser	Glu	Phe	Leu
					310	
						315
Asp	Leu	Pro	Met	Phe	Thr	Ser
				325		
						330
						335
Glu	Lys	Val	Tyr	Pro	Glu	Leu
			340			
						345
						350
Pro	Gln	Gly	Met	Leu	Ser	Ala
		355				
						360
						365
Leu	Gly	Val	Lys	Pro	Glu	Asp
	370					375
						380
Thr	Ala	Lys	Lys	Asp	Glu	Ala
					390	
						395
Val	Pro	Ala	Val	Asp	Val	Val
				405		
						410
						415
Ile	Arg	Met	Lys	Lys	Ile	Pro
			420			
						425
						430

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Asp Ala Pro Leu Gly Ile Ser Thr Gly Ala Ala Ala Leu Phe Gly Val  
 435 440 445  
 Thr Gly Gly Val Met Glu Ala Ala Leu Arg Thr Ala Tyr Glu Leu Lys  
 450 455 460  
 Thr Gly Lys Ala Leu Pro Lys Ile Val Phe Glu Glu Val Arg Gly Leu  
 465 470 475 480  
 Lys Gly Val Arg Glu Ala Glu Ile Asp Leu Asp Gly Lys Lys Ile Arg  
 485 490 495  
 Ile Ala Val Val His Gly Thr Ala Asn Val Arg Asn Leu Val Glu Lys  
 500 505 510  
 Ile Leu Arg Arg Glu Val Lys Tyr His Phe Val Glu Val Met Ala Cys  
 515 520 525  
 Pro Gly Gly Cys Ile Gly Gly Gly Gly Gln Pro Tyr Ser Arg Asp Pro  
 530 535 540  
 Glu Ile Leu Arg Lys Arg Ala Glu Ala Ile Tyr Thr Ile Asp Glu Arg  
 545 550 555 560  
 Met Thr Leu Arg Lys Ser His Glu Asn Pro Ala Ile Lys Lys Leu Tyr  
 565 570 575  
 Glu Glu Tyr Leu Glu His Pro Leu Ser His Lys Ala His Glu Leu Leu  
 580 585 590  
 His Thr Tyr Tyr Glu Asp Arg Ser Arg Lys Lys Arg Leu Ala Val Lys  
 595 600 605  
 <210> 91  
 <211> 497  
 <212> PRT  
 <213> C. reinhardtii  
 <400> 91  
 Met Ser Ala Leu Val Leu Lys Pro Cys Ala Ala Val Ser Ile Arg Gly  
 1 5 10 15  
 Ser Ser Cys Arg Ala Arg Gln Val Ala Pro Arg Ala Pro Leu Ala Ala  
 20 25 30  
 Ser Thr Val Arg Val Ala Leu Ala Thr Leu Glu Ala Pro Ala Arg Arg  
 35 40 45  
 Leu Gly Asn Val Ala Cys Ala Ala Ala Ala Pro Ala Ala Glu Ala Pro  
 50 55 60  
 Leu Ser His Val Gln Gln Ala Leu Ala Glu Leu Ala Lys Pro Lys Asp  
 65 70 75 80

Asp Pro Thr Arg Lys His Val Cys Val Gln Val Ala Pro Ala Val Arg  
 85 90 95  
 Val Ala Ile Ala Glu Thr Leu Gly Leu Ala Pro Gly Ala Thr Thr Pro  
 100 105 110  
 Lys Gln Leu Ala Glu Gly Leu Arg Arg Leu Gly Phe Asp Glu Val Phe  
 115 120 125  
 Asp Thr Leu Phe Gly Ala Asp Leu Thr Ile Met Glu Glu Gly Ser Glu  
 130 135 140  
 Leu Leu His Arg Leu Thr Glu His Leu Glu Ala His Pro His Ser Asp  
 145 150 155 160  
 Glu Pro Leu Pro Met Phe Thr Ser Cys Cys Pro Gly Trp Ile Ala Met  
 165 170 175  
 Leu Glu Lys Ser Tyr Pro Asp Leu Ile Pro Tyr Val Ser Ser Cys Lys  
 180 185 190  
 Ser Pro Gln Met Met Leu Ala Ala Met Val Lys Ser Tyr Leu Ala Glu  
 195 200 205  
 Lys Lys Gly Ile Ala Pro Lys Asp Met Val Met Val Ser Ile Met Pro  
 210 215 220  
 Cys Thr Arg Lys Gln Ser Glu Ala Asp Arg Asp Trp Phe Cys Val Asp  
 225 230 235 240  
 Ala Asp Pro Thr Leu Arg Gln Leu Asp His Val Ile Thr Thr Val Glu  
 245 250 255  
 Leu Gly Asn Ile Phe Lys Glu Arg Gly Ile Asn Leu Ala Glu Leu Pro  
 260 265 270  
 Glu Gly Glu Trp Asp Asn Pro Met Gly Val Gly Ser Gly Ala Gly Val  
 275 280 285  
 Leu Phe Gly Thr Thr Gly Gly Val Met Glu Ala Ala Leu Arg Thr Ala  
 290 295 300  
 Tyr Glu Leu Phe Thr Gly Thr Pro Leu Pro Arg Leu Ser Leu Ser Glu  
 305 310 315 320  
 Val Arg Gly Met Asp Gly Ile Lys Glu Thr Asn Ile Thr Met Val Pro  
 325 330 335  
 Ala Pro Gly Ser Lys Phe Glu Glu Leu Leu Lys His Arg Ala Ala Ala  
 340 345 350

Arg Ala Glu Ala Ala Ala His Gly Thr Pro Gly Pro Leu Ala Trp Asp  
 355 360 365

Gly Gly Ala Gly Phe Thr Ser Glu Asp Gly Arg Gly Gly Ile Thr Leu  
 370 375 380

Arg Val Ala Val Ala Asn Gly Leu Gly Asn Ala Lys Lys Leu Ile Thr  
 385 390 395 400

Lys Met Gln Ala Gly Glu Ala Lys Tyr Asp Phe Val Glu Ile Met Ala  
 405 410 415

Cys Pro Ala Gly Cys Val Gly Gly Gly Gly Gln Pro Arg Ser Thr Asp  
 420 425 430

Lys Ala Ile Thr Gln Lys Arg Gln Ala Ala Leu Tyr Asn Leu Asp Glu  
 435 440 445

Lys Ser Thr Leu Arg Arg Ser His Glu Asn Pro Ser Ile Arg Glu Leu  
 450 455 460

Tyr Asp Thr Tyr Leu Gly Glu Pro Leu Gly His Lys Ala His Glu Leu  
 465 470 475 480

Leu His Thr His Tyr Val Ala Gly Gly Val Glu Glu Lys Asp Glu Lys  
 485 490 495

Lys

<210> 92  
 <211> 581  
 <212> PRT  
 <213> T. tencongensis

<400> 92

Met Asp Lys Val Arg Val Thr Ile Asp Gly Ile Thr Val Glu Val Pro  
 1 5 10 15

Ser Tyr Tyr Thr Val Leu Glu Ala Ala Lys Glu Ala Gly Ile Asp Ile  
 20 25 30

Pro Thr Leu Cys Tyr Leu Lys Glu Ile Asn Gln Ile Gly Ala Cys Arg  
 35 40 45

Ile Cys Leu Val Glu Ile Glu Gly Val Arg Asn Leu Gln Thr Ser Cys  
 50 55 60

Thr Tyr Pro Val Phe Asp Gly Met Lys Val Tyr Thr Asn Thr Pro Lys  
 65 70 75 80

Ile Arg Glu Ala Arg Arg Leu Asn Leu Glu Leu Ile Leu Ser Asn His  
 85 90 95

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Asp Arg Asn Cys<sub>100</sub> Leu Thr Cys Val<sub>105</sub> Ser Thr Asn Cys<sub>110</sub> Glu Leu Gln  
 Ala Leu Ala<sub>115</sub> Lys Arg Leu Gly Val<sub>120</sub> Glu Glu Ile Arg Phe<sub>125</sub> Glu Gly Glu  
 Asn Ile<sub>130</sub> Lys Tyr Pro Ile Asp<sub>135</sub> Asp Ala Ser Pro Ala<sub>140</sub> Val Val Arg Asp  
 Pro<sub>145</sub> Asn Lys Cys Val<sub>150</sub> Leu Cys Arg Arg Cys Val<sub>155</sub> Ala Val Cys Ser Glu<sub>160</sub>  
 Val Gln Asn Val<sub>165</sub> Phe Ala Ile Gly Met Val<sub>170</sub> Asn Arg Gly Phe Lys<sub>175</sub> Thr  
 Met Val Ala<sub>180</sub> Pro Ser Phe Gly Arg Ser<sub>185</sub> Leu Lys Asp Ser Pro<sub>190</sub> Cys Ile  
 Ser Cys Gly<sub>195</sub> Gln Cys Ile Met Val<sub>200</sub> Cys Pro Val Gly Ala<sub>205</sub> Ile Tyr Glu  
 Lys Asp<sub>210</sub> His Thr Lys Arg Val<sub>215</sub> Tyr Glu Ala Leu Ala<sub>220</sub> Asp Asp Lys Lys  
 Tyr Val Val Ala Gln Thr<sub>230</sub> Ala Pro Ala Val Arg<sub>235</sub> Val Ala Leu Gly Glu<sub>240</sub>  
 Glu Phe Gly Met<sub>245</sub> Pro Val Gly Thr Ile Val<sub>250</sub> Thr Gly Lys Met Ala<sub>255</sub> Ala  
 Ala Leu Arg Arg<sub>260</sub> Met Gly Phe Asp Ala<sub>265</sub> Val Phe Asp Thr Asn<sub>270</sub> Phe Ala  
 Ala Asp Leu<sub>275</sub> Thr Ile Met Glu Glu<sub>280</sub> Gly Ser Glu Leu Leu<sub>285</sub> Glu Arg Ile  
 Lys His<sub>290</sub> Gly Gly Lys Leu Pro<sub>295</sub> Met Ile Thr Ser Cys<sub>300</sub> Ser Pro Gly Trp  
 Ile Ala Phe Cys Glu Lys<sub>310</sub> Tyr Tyr Pro Glu Phe<sub>315</sub> Ile Asp Asn Leu Ser<sub>320</sub>  
 Thr Cys Lys Ser<sub>325</sub> Pro His Met Met Met Gly<sub>330</sub> Ala Leu Val Lys Ser<sub>335</sub> Tyr  
 Tyr Ala Glu Lys<sub>340</sub> Lys Gly Leu Asp Pro<sub>345</sub> Lys Asp Ile Phe Val<sub>350</sub> Val Ser  
 Ile Met Pro<sub>355</sub> Cys Thr Ala Lys Lys<sub>360</sub> Leu Glu Ile Glu Arg<sub>365</sub> Glu Glu Met  
 Ile Arg Asn Gly Met Lys Asp Val Asp Ala Val Leu Thr Thr Arg Glu

370

375

Leu Ala Arg Met Ile Lys Glu Met Gly Ile Asp Phe Val Asn Leu Lys  
385 390 395 400

Asp Glu Glu Phe Asp Glu Pro Leu Gly Met Ser Thr Gly Ala Gly Ala  
405 410 415

Ile Phe Gly Ala Thr Gly Gly Val Met Glu Ala Ala Leu Arg Thr Val  
420 425 430

Ala Glu Ile Val Glu Gly Arg Asp Ile Gly Lys Ile Asp Phe Glu Glu  
435 440 445

Val Arg Gly Leu Glu Gly Val Arg Glu Ala Thr Ile Thr Ile Asp Gly  
450 455 460

Met Asp Ile Lys Ile Ala Ile Ala Asn Gly Thr Gly Asn Ala Lys Lys  
465 470 475 480

Leu Leu Asp Lys Val Lys Ala Gly Glu Val Glu Tyr His Phe Ile Glu  
485 490 495

Val Met Gly Cys Pro Gly Gly Cys Ile Met Gly Gly Gly Gln Pro Ile  
500 505 510

His Asn Pro Asn Glu Met Glu Glu Val Lys Lys Leu Arg Ala Lys Ala  
515 520 525

Ile Tyr Glu Ile Asp Lys Asn Leu Pro Ile Arg Lys Ser His Glu Asn  
530 535 540

Pro Ala Ile Lys Arg Leu Tyr Glu Glu Phe Leu Gly Tyr Pro Leu Ser  
545 550 555 560

Glu Lys Ser His Glu Leu Leu His Thr His Tyr Ser Arg Lys Glu Leu  
565 570 575

Tyr Pro Leu Val Lys  
580

<210> 93  
<211> 636  
<212> PRT  
<213> N. frontalis

<400> 93

Met Ser Met Leu Ser Ser Val Leu Asn Lys Ala Val Val Asn Pro Lys  
1 5 10 15

Leu Thr Arg Ser Leu Ala Thr Ala Ala Glu Lys Met Val Asn Ile  
20 25 30

Ser Ile Asn Gly Arg Lys Phe Gln Val Lys Pro Lys Thr Thr Val Leu  
 35 40 45  
 Glu Ala Ala Lys Ala Asn Gly Tyr Tyr Ile Pro Thr Leu Cys Tyr His  
 50 55 60  
 Gln Glu Leu Pro Val Ala Gly Asn Cys Arg Leu Cys Leu Val Tyr Ala  
 65 70 75 80  
 Lys Gly Ser Trp Lys Pro Leu Thr Ala Cys Thr Thr Glu Val Trp Glu  
 85 90 95  
 Gly Met Glu Ile Glu Thr Asp Ser Pro Ala Val Ile Glu Thr Val Arg  
 100 105 110  
 Ser Ser Leu Ser Met Met Arg Glu Glu His Pro Asn Asp Cys Met Thr  
 115 120 125  
 Cys Gly Ser Asn Gly Asp Cys Glu Phe Gln Asp Leu Ile Tyr Arg Tyr  
 130 135 140  
 Gln Ile Asp Ala Lys His Pro Val Arg Ser Leu Leu Lys His Lys Ser  
 145 150 155 160  
 Lys Lys Thr Asn His Ser Ile Thr Glu Pro Cys Tyr Ser Pro Phe Asp  
 165 170 175  
 Asn Thr Thr Phe Ser Val Ala Arg Asp Met Asn Lys Cys Val Lys Cys  
 180 185 190  
 Gly Arg Cys Ile Arg Ala Cys His His Phe Gln Asn Ile Asn Ile Leu  
 195 200 205  
 Gly Phe Ile Asn Arg Ala Gly Tyr Glu Arg Val Gly Thr Pro Met Asp  
 210 215 220  
 Arg Pro Met Asn Phe Thr Lys Cys Val Glu Cys Gly Gln Cys Ser Gln  
 225 230 235 240  
 Val Cys Pro Val Gly Ala Ile Thr Ala Arg Thr Glu Val Val Asp Val  
 245 250 255  
 Leu Arg His Leu Asp Thr Lys Arg Lys Val Val Val Cys Ser Thr Ala  
 260 265 270  
 Pro Ala Ile Arg Val Ala Pro Ala Glu Glu Phe Ser Thr Glu Ala Asp  
 275 280 285  
 Phe Asp Phe Thr Gly Lys Met Val Ala Gly Leu Arg Lys Leu Gly Phe  
 290 295 300  
 Asp Tyr Ile Phe Asp Thr Asn Phe Ser Ala Asp Leu Thr Ile Met Glu  
 305 310 315 320

Glu Gly Thr Glu Leu Ile Asp Arg Leu Asn Asn Gly Gly Lys Phe Pro  
 325 330 335  
 Met Phe Thr Ser Cys Cys Pro Gly Trp Ile Asn Met Val Glu Lys Ser  
 340 345 350  
 Tyr Pro Glu Leu Ser Asp Asn Leu Ser Ser Cys Lys Ser Pro Gln Gln  
 355 360 365  
 Met Ile Gly Ala Val Ile Lys Ser Tyr Phe Ala Lys Lys Leu Gly Leu  
 370 375 380  
 Ser Thr Glu Asp Ile Ile His Val Ser Ile Met Pro Cys Thr Ala Lys  
 385 390 395 400  
 Lys Gly Glu Ala Arg Arg Pro Glu Phe Val Gln Lys Gly Lys Asp Gly  
 405 410 415  
 Lys Asp Tyr Pro Asp Ile Asp Tyr Val Ile Thr Thr Arg Glu Leu Leu  
 420 425 430  
 Thr Leu Leu Lys Leu Lys Lys Ile Asn Pro Ala Glu Leu Pro Asp Asp  
 435 440 445  
 Lys Phe Asp Ser Pro Leu Gly Ile Gly Ser Ser Ala Gly Asn Leu Phe  
 450 455 460  
 Gly Val Thr Gly Gly Val Met Glu Ala Ala Ile Arg Thr Ala Gln Val  
 465 470 475 480  
 Ile Thr Gly Val Glu Asn Pro Ile Pro Leu Gly Glu Leu Lys Ala Ile  
 485 490 495  
 Arg Gly Leu Asp Gly Ile Lys Ala Ala Asn Val Pro Leu Lys Thr Lys  
 500 505 510  
 Asp Gly Lys Glu Val Ser Val Arg Ala Ala Val Val Ser Gly Gly Ala  
 515 520 525  
 Asn Ile Gln Lys Phe Leu Glu Lys Ile Lys Asn Lys Glu Leu Glu Phe  
 530 535 540  
 Asp Phe Ile Glu Met Met Met Cys Pro Gly Gly Cys Ile Asn Gly Gly  
 545 550 555 560  
 Gly Gln Pro Lys Ser Ala Asp Pro Glu Ile Val Ala Lys Lys Met Gln  
 565 570 575  
 Arg Met Tyr Thr Met Asp Asp Gln Ala Lys Leu Arg Leu Cys His Glu  
 580 585 590



Asn Pro Glu Ile Ile Asp Val Tyr Lys Asn Phe Leu Gly Glu Pro Asn  
 595 600 605

Ser His Leu Ala His Glu Leu Leu His Thr His Tyr Asn Asp Arg Ser  
 610 615 620

Lys Thr Ile His Asp Met Gly His His Glu Lys Lys  
 625 630 635

<210> 94  
 <211> 579  
 <212> PRT  
 <213> C. thermocellum  
 <400> 94

Met Val Asn Val Thr Ile Asp Asn Cys Lys Ile Gln Val Pro Ala Asn  
 1 5 10 15

Tyr Thr Val Leu Glu Ala Ala Lys Gln Ala Asn Ile Asp Ile Pro Thr  
 20 25 30

Leu Cys Phe Leu Lys Asp Ile Asn Glu Val Gly Ala Cys Arg Met Cys  
 35 40 45

Val Val Glu Val Lys Gly Ala Arg Ser Leu Gln Ala Ala Cys Val Tyr  
 50 55 60

Pro Val Ser Glu Gly Leu Glu Val Tyr Thr Gln Thr Pro Ala Val Arg  
 65 70 75 80

Glu Ala Arg Lys Val Thr Leu Glu Leu Ile Leu Ser Asn His Glu Lys  
 85 90 95

Lys Cys Leu Thr Cys Val Arg Ser Glu Asn Cys Glu Leu Gln Arg Leu  
 100 105 110

Ala Lys Asp Leu Asn Val Lys Asp Ile Arg Phe Glu Gly Glu Met Ser  
 115 120 125

Asn Leu Pro Ile Asp Asp Leu Ser Pro Ser Val Val Arg Asp Pro Asn  
 130 135 140

Lys Cys Val Leu Cys Arg Arg Cys Val Ser Met Cys Lys Asn Val Gln  
 145 150 155 160

Thr Val Gly Ala Ile Asp Val Thr Glu Arg Gly Phe Arg Thr Thr Val  
 165 170 175

Ser Thr Ala Phe Asn Lys Pro Leu Ser Glu Val Pro Cys Val Asn Cys  
 180 185 190

Gly Gln Cys Ile Asn Val Cys Pro Val Gly Ala Leu Arg Glu Lys Asp  
 195 200 205

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Asp Ile Asp Lys Val Trp Glu Ala Leu Ala Asn Pro Glu Leu His Val  
 210 215 220  
 Val Val Gln Thr Ala Pro Ala Val Arg Val Ala Leu Gly Glu Glu Phe  
 225 230 235 240  
 Gly Met Pro Ile Gly Ser Arg Val Thr Gly Lys Met Val Ala Ala Leu  
 245 250 255  
 Ser Arg Leu Gly Phe Lys Lys Val Phe Asp Thr Asp Thr Ala Ala Asp  
 260 265 270  
 Leu Thr Ile Met Glu Glu Gly Thr Glu Leu Ile Asn Arg Ile Lys Asn  
 275 280 285  
 Gly Gly Lys Leu Pro Leu Ile Thr Ser Cys Ser Pro Gly Trp Ile Lys  
 290 295 300  
 Phe Cys Glu His Asn Tyr Pro Glu Phe Leu Asp Asn Leu Ser Ser Cys  
 305 310 315 320  
 Lys Ser Pro His Glu Met Phe Gly Ala Val Leu Lys Ser Tyr Tyr Ala  
 325 330 335  
 Gln Lys Asn Gly Ile Asp Pro Ser Lys Val Phe Val Gly Ser Ile Met  
 340 345 350  
 Pro Cys Thr Ala Lys Lys Phe Glu Ala Gln Arg Pro Glu Leu Ser Ser  
 355 360 365  
 Thr Gly Tyr Pro Asp Val Asp Val Val Leu Thr Thr Arg Glu Leu Ala  
 370 375 380  
 Arg Met Ile Lys Glu Thr Gly Ile Asp Phe Asn Ser Leu Pro Asp Lys  
 385 390 395 400  
 Gln Phe Asp Asp Pro Met Gly Glu Ala Ser Gly Ala Gly Val Ile Phe  
 405 410 415  
 Gly Ala Thr Gly Gly Val Met Glu Ala Ala Ile Arg Thr Val Gly Glu  
 420 425 430  
 Leu Leu Ser Gly Lys Pro Ala Asp Lys Ile Glu Tyr Thr Glu Val Arg  
 435 440 445  
 Gly Leu Asp Gly Ile Lys Glu Ala Ser Ile Glu Leu Asp Gly Phe Thr  
 450 455 460  
 Leu Lys Ala Ala Val Ala His Gly Leu Gly Asn Ala Arg Lys Leu Leu  
 465 470 475 480  
 Asp Lys Ile Lys Ala Gly Glu Ala Asp Tyr His Phe Ile Glu Ile Met

485

490

495

Ala Cys Pro Gly Gly Cys Ile Asn Gly Gly Gly Gln Pro Ile Gln Pro  
                   500                  505                  510

Ser Ser Val Arg Asn Trp Lys Asp Ile Arg Cys Glu Arg Ala Lys Ala  
           515                  520                  525

Ile Tyr Glu Glu Asp Glu Ser Leu Pro Ile Arg Lys Ser His Glu Asn  
       530                  535                  540

Pro Lys Ile Lys Met Leu Tyr Glu Glu Phe Phe Gly Glu Pro Gly Ser  
   545                  550                  555                  560

His Lys Ala His Glu Leu Leu His Thr His Tyr Glu Lys Arg Glu Asn  
                   565                  570                  575

Tyr Pro Val

<210> 95  
 <211> 588  
 <212> PRT  
 <213> B. thetaoimicron

<400> 95

Met Glu Glu Lys Gln Ile Thr Leu Gln Ile Asp Gly His Phe Ile Thr  
   1                  5                  10                  15

Val Pro Glu Gly Ser Thr Ile Leu Glu Ala Ala Cys Lys Ile Gly Ile  
           20                  25                  30

Asn Ile Pro Thr Leu Cys His Ile Asp Leu Lys Gly Thr Cys Ile Lys  
           35                  40                  45

Asn Asn Pro Ala Ser Cys Arg Ile Cys Val Val Glu Val Ala Gly Arg  
   50                  55                  60

Arg Asn Leu Ala Pro Ala Cys Ala Thr Arg Cys Thr Glu Gly Met Val  
   65                  70                  75                  80

Val Lys Thr Ser Thr Leu Arg Val Met Asn Ala Arg Lys Val Val Ala  
           85                  90                  95

Glu Leu Ile Leu Ser Asp His Pro Asn Asp Cys Leu Thr Cys Pro Lys  
           100                  105                  110

Cys Gly Asn Cys Glu Leu Gln Thr Leu Ala Leu Arg Phe Asn Ile Arg  
           115                  120                  125

Glu Met Pro Phe Asn Gly Gly Glu Leu Ser Pro Arg Lys Arg Glu Val  
   130                  135                  140

Thr Ser Ser Ile Val Arg Asn Met Asp Lys Cys Ile Phe Cys Arg Arg  
 145 150 155 160  
 Cys Glu Ser Val Cys Asn Asp Val Gln Thr Val Gly Ala Leu Gly Ala  
 165 170 175  
 Ile Arg Arg Gly Phe Asn Thr Thr Ile Ala Pro Ala Phe Asp Arg Met  
 180 185 190  
 Met Lys Asp Ser Glu Cys Thr Tyr Cys Gly Gln Cys Val Ala Val Cys  
 195 200 205  
 Pro Val Gly Ala Leu Thr Glu Arg Asp Tyr Thr Asn Arg Leu Leu Asp  
 210 215 220  
 Asp Leu Ala Asp Pro Asp Lys Ile Val Ile Val Gln Thr Ala Pro Ala  
 225 230 235 240  
 Val Arg Ala Ala Leu Gly Glu Glu Phe Gly Leu Pro Pro Gly Thr Leu  
 245 250 255  
 Val Thr Gly Lys Met Val Tyr Ala Leu Arg Glu Leu Gly Phe Asp Tyr  
 260 265 270  
 Val Phe Asp Thr Asp Phe Ala Ala Asp Leu Thr Ile Met Glu Glu Gly  
 275 280 285  
 Ser Glu Ile Leu Asn Arg Leu Thr Arg Tyr Leu Asp Gly Asp Lys Ser  
 290 295 300  
 Val Arg Leu Pro Ile Leu Thr Ser Cys Cys Pro Ala Trp Val Asn Phe  
 305 310 315 320  
 Phe Glu His His Phe Pro Asp Met Leu Asp Ile Pro Ser Thr Ala Arg  
 325 330 335  
 Ser Pro Gln Gln Met Phe Gly Ser Ile Ala Lys Ser Tyr Trp Ala Glu  
 340 345 350  
 Lys Met Gly Ile Pro Arg Glu Lys Leu Val Val Val Ser Ile Met Pro  
 355 360 365  
 Cys Leu Ala Lys Lys Tyr Glu Cys Asp Arg Asp Glu Phe Lys Val Asn  
 370 375 380  
 Gly Val Pro Asp Val Asp Tyr Ser Ile Ser Thr Arg Glu Leu Ala Arg  
 385 390 395 400  
 Leu Ile Lys Arg Ala Asn Ile Gly Phe Thr Leu Val Leu Asp Ser Pro  
 405 410 415  
 Phe Asp Asn Pro Met Gly Glu Ser Thr Gly Ala Gly Val Ile Phe Gly  
 420 425 430

Thr Thr Gly Gly Val Met Glu Ala Ala Leu Arg Ser Val Tyr Glu Ile  
435 440 445

Tyr Thr Gly Gln Pro Leu Lys Asn Val Asn Phe Glu Gln Val Arg Gly  
450 455 460

Leu Ser Gly Val Arg Arg Ala Thr Ile Asp Leu Asn Gly Phe Glu Leu  
465 470 475 480

Lys Val Gly Ile Ala His Gly Leu Gly Asn Ala Arg His Leu Leu Glu  
485 490 495

Asp Ile Arg Asn Gly His Asn Glu Tyr His Val Ile Glu Ile Met Ala  
500 505 510

Cys Pro Gly Gly Cys Ile Gly Gly Gly Gly Gln Pro Leu His His Gly  
515 520 525

Asn Ser Asp Val Leu Tyr Ala Arg Ala Asn Ala Leu Tyr Arg Glu Asp  
530 535 540

Ala Asn Lys Pro Leu Arg Lys Ser His Asp Asn Pro Tyr Ile Gln Lys  
545 550 555 560

Leu Tyr Glu Glu Tyr Leu Gly Lys Pro Leu Gly Glu Lys Ser Glu Met  
565 570 575

Leu Leu His Thr His Tyr Phe Asn Lys Ser Ile Asp  
580 585

<210> 96  
<211> 585  
<212> PRT  
<213> D. fructosovorans

<400> 96

Met Ser Met Leu Thr Ile Thr Ile Asp Gly Lys Thr Thr Ser Val Pro  
1 5 10 15

Glu Gly Ser Thr Ile Leu Asp Ala Ala Lys Thr Leu Asp Ile Asp Ile  
20 25 30

Pro Thr Leu Cys Tyr Leu Asn Leu Glu Ala Leu Ser Ile Asn Asn Lys  
35 40 45

Ala Ala Ser Cys Arg Val Cys Val Val Glu Val Glu Gly Arg Arg Asn  
50 55 60

Leu Ala Pro Ser Cys Ala Thr Pro Val Thr Asp Asn Met Val Val Lys  
65 70 75 80

Thr Asn Ser Leu Arg Val Leu Asn Ala Arg Arg Thr Val Leu Glu Leu  
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Leu Leu Ser Asp His Pro Lys Asp Cys Leu Val Cys Ala Lys Ser Gly  
 100 105 110  
 Glu Cys Glu Leu Gln Thr Leu Ala Glu Arg Phe Gly Ile Arg Glu Ser  
 115 120 125  
 Pro Tyr Asp Gly Gly Glu Met Ser His Tyr Arg Lys Asp Ile Ser Ala  
 130 135 140  
 Ser Ile Ile Arg Asp Met Asp Lys Cys Ile Met Cys Arg Arg Cys Glu  
 145 150 155 160  
 Thr Met Cys Asn Thr Val Gln Thr Cys Gly Val Leu Ser Gly Val Asn  
 165 170 175  
 Arg Gly Phe Thr Ala Val Val Ala Pro Ala Phe Glu Met Asn Leu Ala  
 180 185 190  
 Asp Thr Val Cys Thr Asn Cys Gly Gln Cys Val Ala Val Cys Pro Thr  
 195 200 205  
 Gly Ala Leu Val Glu His Glu Tyr Ile Trp Glu Val Val Glu Ala Leu  
 210 215 220  
 Ala Asn Pro Asp Lys Val Val Ile Val Gln Thr Ala Pro Ala Val Arg  
 225 230 235 240  
 Ala Ala Leu Gly Glu Asp Leu Gly Val Ala Pro Gly Thr Ser Val Thr  
 245 250 255  
 Gly Lys Met Ala Ala Ala Leu Arg Arg Leu Gly Phe Asp His Val Phe  
 260 265 270  
 Asp Thr Asp Phe Ala Ala Asp Leu Thr Ile Met Glu Glu Gly Ser Glu  
 275 280 285  
 Phe Leu Asp Arg Leu Gly Lys His Leu Ala Gly Asp Thr Asn Val Lys  
 290 295 300  
 Leu Pro Ile Leu Thr Ser Cys Cys Pro Gly Trp Val Lys Phe Phe Glu  
 305 310 315 320  
 His Gln Phe Pro Asp Met Leu Asp Val Pro Ser Thr Ala Lys Ser Pro  
 325 330 335  
 Gln Gln Met Phe Gly Ala Ile Ala Lys Thr Tyr Tyr Ala Asp Leu Leu  
 340 345 350  
 Gly Ile Pro Arg Glu Lys Leu Val Val Val Ser Val Met Pro Cys Leu  
 355 360 365

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Ala Lys Lys Tyr Glu Cys Ala Arg Pro Glu Phe Ser Val Asn Gly Asn  
370 375 380

Pro Asp Val Asp Ile Val Ile Thr Thr Arg Glu Leu Ala Lys Leu Val  
385 390 400

Lys Arg Met Asn Ile Asp Phe Ala Gly Leu Pro Asp Glu Asp Phe Asp  
405 410 415

Ala Pro Leu Gly Ala Ser Thr Gly Ala Ala Pro Ile Phe Gly Val Thr  
420 425 430

Gly Gly Val Ile Glu Ala Ala Leu Arg Thr Ala Tyr Glu Leu Ala Thr  
435 440 445

Gly Glu Thr Leu Lys Lys Val Asp Phe Glu Asp Val Arg Gly Met Asp  
450 455 460

Gly Val Lys Lys Ala Lys Val Lys Val Gly Asp Asn Glu Leu Val Ile  
465 470 475 480

Gly Val Ala His Gly Leu Gly Asn Ala Arg Glu Leu Leu Lys Pro Cys  
485 490 495

Gly Ala Gly Glu Thr Phe His Ala Ile Glu Val Met Ala Cys Pro Gly  
500 505 510

Gly Cys Ile Gly Gly Gly Gly Gln Pro Tyr His His Gly Asp Val Glu  
515 520 525

Leu Leu Lys Lys Arg Thr Gln Val Leu Tyr Ala Glu Asp Ala Gly Lys  
530 535 540

Pro Leu Arg Lys Ser His Glu Asn Pro Tyr Ile Ile Glu Leu Tyr Glu  
545 550 555 560

Lys Phe Leu Gly Lys Pro Leu Ser Glu Arg Ser His Gln Leu Leu His  
565 570 575

Thr His Tyr Phe Lys Arg Gln Arg Leu  
580 585

<210> 97  
<211> 606  
<212> PRT  
<213> D. vulgaris

<400> 97

Met Asn Ala Phe Ile Asn Gly Lys Glu Val Arg Cys Glu Pro Gly Arg  
1 5 10 15

Thr Ile Leu Glu Ala Ala Arg Glu Asn Gly His Phe Ile Pro Thr Leu  
20 25 30

Cys Glu Leu Ala Asp Ile Gly His Ala Pro Gly Thr Cys Arg Val Cys  
 35 40 45  
 Leu Val Glu Ile Trp Arg Asp Lys Glu Ala Gly Pro Gln Ile Val Thr  
 50 55 60  
 Ser Cys Thr Thr Pro Val Glu Glu Gly Met Arg Ile Phe Thr Arg Thr  
 65 70 75 80  
 Pro Glu Val Arg Arg Met Gln Arg Leu Gln Val Glu Leu Leu Leu Ala  
 85 90 95  
 Asp His Asp His Asp Cys Ala Ala Cys Ala Arg His Gly Asp Cys Glu  
 100 105 110  
 Leu Gln Asp Val Ala Gln Phe Val Gly Leu Thr Gly Thr Arg His His  
 115 120 125  
 Phe Pro Asp Tyr Ala Arg Ser Arg Thr Arg Asp Val Ser Ser Pro Ser  
 130 135 140  
 Val Val Arg Asp Met Gly Lys Cys Ile Arg Cys Leu Arg Cys Val Ala  
 145 150 155 160  
 Val Cys Arg Asn Val Gln Gly Val Asp Ala Leu Val Val Thr Gly Asn  
 165 170 175  
 Gly Ile Gly Thr Glu Ile Gly Leu Arg His Asn Arg Ser Gln Ser Ala  
 180 185 190  
 Ser Asp Cys Val Gly Cys Gly Gln Cys Thr Leu Val Cys Pro Val Gly  
 195 200 205  
 Ala Leu Ala Gly Arg Asp Asp Val Glu Arg Val Ile Asp Tyr Leu Tyr  
 210 215 220  
 Asp Pro Glu Ile Val Thr Val Phe Gln Phe Ala Pro Ala Val Arg Val  
 225 230 235 240  
 Gly Leu Gly Glu Glu Phe Gly Leu Pro Pro Gly Ser Ser Val Glu Gly  
 245 250 255  
 Gln Val Pro Thr Ala Leu Arg Leu Leu Gly Ala Asp Val Val Leu Asp  
 260 265 270  
 Thr Asn Phe Ala Ala Asp Leu Val Ile Met Glu Glu Gly Thr Glu Leu  
 275 280 285  
 Leu Gln Arg Leu Arg Gly Gly Ala Lys Leu Pro Leu Phe Thr Ser Cys  
 290 295 300



Cys Pro Gly Trp Val Asn Phe Ala Glu Lys His Leu Pro Asp Ile Leu  
 305 310 315 320  
 Pro His Val Ser Thr Thr Arg Ser Pro Gln Gln Cys Leu Gly Ala Leu  
 325 330 335  
 Ala Lys Thr Tyr Leu Ala Arg Thr Met Asn Val Ala Pro Glu Arg Met  
 340 345 350  
 Arg Val Val Ser Leu Met Pro Cys Thr Ala Lys Lys Glu Glu Ala Ala  
 355 360 365  
 Arg Pro Glu Phe Arg Arg Asp Gly Val Arg Asp Val Asp Ala Val Leu  
 370 375 380  
 Thr Thr Arg Glu Phe Ala Arg Leu Leu Arg Arg Glu Gly Ile Asp Leu  
 385 390 395 400  
 Ala Gly Leu Glu Pro Ser Pro Cys Asp Asp Pro Leu Met Gly Arg Ala  
 405 410 415  
 Thr Gly Ala Ala Val Ile Phe Gly Thr Thr Gly Gly Val Met Glu Ala  
 420 425 430  
 Ala Leu Arg Thr Val Tyr His Val Leu Asn Gly Lys Glu Leu Ala Pro  
 435 440 445  
 Val Glu Leu His Ala Leu Arg Gly Tyr Glu Asn Val Arg Glu Ala Val  
 450 455 460  
 Val Pro Leu Gly Glu Gly Asn Gly Ser Val Lys Val Ala Val Val His  
 465 470 475 480  
 Gly Leu Lys Ala Ala Arg Gln Met Val Glu Ala Val Leu Ala Gly Lys  
 485 490 495  
 Ala Asp His Val Phe Val Glu Val Met Ala Cys Pro Gly Gly Cys Met  
 500 505 510  
 Asp Gly Gly Gly Gln Pro Arg Ser Lys Arg Ala Tyr Asn Pro Asn Ala  
 515 520 525  
 Gln Ala Arg Arg Ala Ala Leu Phe Ser Leu Asp Ala Glu Asn Ala Leu  
 530 535 540  
 Arg Gln Ser His Asn Asn Pro Leu Ile Gly Lys Val Tyr Glu Ser Phe  
 545 550 555 560  
 Leu Gly Glu Pro Cys Ser Asn Leu Ser His Arg Leu Leu His Thr Arg  
 565 570 575  
 Tyr Gly Asp Arg Lys Ser Glu Val Ala Tyr Thr Met Arg Asp Ile Trp  
 580 585 590

His Glu Met Thr Leu Gly Arg Arg Val Arg Gly Asp Ser Asp  
 595 600 605

<210> 98  
 <211> 589  
 <212> PRT  
 <213> T. vaginalis

<400> 98

Ala Ser Thr Gly Ile Asn Ser Thr Ala Asn Ile Leu Arg Asn Ile Thr  
 1 5 10 15

Val Thr Val Asn Gly Lys Pro Leu Glu Ala Lys Lys Gly Glu Thr Val  
 20 25 30

Leu Glu Leu Cys Asp Arg Asn Asn Ile Arg Ile Pro Arg Leu Cys Phe  
 35 40 45

His Pro Asn Leu Pro Pro Lys Ala Ser Cys Arg Val Cys Leu Val Glu  
 50 55 60

Cys Asp Gly Lys Trp Leu Ser Pro Ala Cys Val Thr Thr Val Trp Asp  
 65 70 75 80

Gly Leu Lys Ile Asp Thr Lys Ser Lys Asn Val Arg Asp Ser Val Glu  
 85 90 95

Asn Asn Leu Lys Glu Leu Leu Asp Cys His Asp Glu Thr Cys Ser Ala  
 100 105 110

Cys Ile Ala Asn His Arg Cys Gln Phe Arg Asp Met Asn Val Ala Tyr  
 115 120 125

Ser Val Lys Ala Glu Thr Lys Glu Ile Cys Ser Glu Glu Gly Ile Asp  
 130 135 140

Glu Ser Thr Asn Ala Ile Arg Leu Asp Thr Ser Lys Cys Val Leu Cys  
 145 150 155 160

Gly Arg Cys Ile Arg Ala Cys Glu Glu Val Ala Gly Thr Ser Ala Ile  
 165 170 175

Ile Phe Gly Asn Arg Ala Lys Lys Met Arg Ile Gln Pro Thr Phe Gly  
 180 185 190

Val Thr Leu Gln Glu Thr Ser Cys Ile Lys Cys Gly Gln Cys Thr Leu  
 195 200 205

Tyr Cys Pro Val Gly Ala Ile Thr Glu Lys Ser Gln Val Lys Glu Ala  
 210 215 220

Leu Asp Ile Leu Ala Asn Lys Gly Lys Lys Ile Thr Val Val Gln Val

225                      230                      235                      240  
 Ala Pro Ala Val Arg Val Ala Leu Ser Glu Ala Phe Gly Tyr Lys Glu  
                                  245                      250                      255  
 Gly Thr Val Thr Thr Gly Lys Met Val Ser Ala Leu Lys Ala Leu Gly  
                                  260                      265                      270  
 Phe Asp Leu Val Tyr Asp Thr Asn Tyr Gly Ala Asp Leu Thr Ile Cys  
                                  275                      280                      285  
 Glu Glu Ala Gly Glu Leu Val Asn Arg Leu Arg Asp Pro Asn Ala Lys  
                                  290                      295                      300  
 Phe Pro Met Phe Thr Thr Cys Cys Pro Ala Trp Val Asn Tyr Val Glu  
 305                                   310                      315                      320  
 Gln Ser Ala Pro Asp Phe Ile Pro Asn Leu Ser Ser Cys Arg Ser Pro  
                                  325                      330                      335  
 Gln Gly Met Leu Ser Ala Leu Ile Lys Asn Tyr Leu Pro Lys Leu Leu  
                                  340                      345                      350  
 Asp Val Lys Gln Glu Asp Val Leu Asn Phe Ser Ile Met Pro Cys Thr  
                                  355                      360                      365  
 Ala Lys Lys Asp Glu Val Glu Arg Pro Glu Leu Arg Thr Lys Ser Gly  
                                  370                      375                      380  
 Leu Lys Glu Thr Asp Met Val Leu Thr Val Arg Glu Leu Val Glu Met  
 385                                   390                      395                      400  
 Ile Lys Leu Ser Asn Ile Asp Phe Asn Asn Leu Pro Asp Thr Gln Phe  
                                  405                      410                      415  
 Asp Asn Ile Phe Gly Phe Gly Ser Gly Ala Gly Gln Ile Phe Ala Ala  
                                  420                      425                      430  
 Thr Gly Gly Val Met Glu Ala Ala Ser Arg Thr Ala Phe Glu Val Tyr  
                                  435                      440                      445  
 Thr Gly Lys Lys Leu Thr Asn Val Asn Ile Tyr Pro Val Arg Gly Met  
                                  450                      455                      460  
 Asp Gly Leu Arg Ile Ala Glu Leu Asp Leu Asp Gly Thr Lys Leu Lys  
 465                                   470                      475                      480  
 Val Ala Val Cys His Gly Ile Ala Asn Thr Ala Lys Leu Leu Asp Arg  
                                  485                      490                      495  
 Leu Arg Glu Lys Asp Pro Glu Leu Met Asp Ile Lys Phe Ile Glu Ile  
                                  500                      505                      510

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Met Ala Cys Pro Gly Gly Cys Val Cys Gly Gly Gly Thr Pro Gln Pro  
515 520 525

Lys Asn Arg Val Ser Leu Asp Asn Arg Leu Ala Ala Ile Tyr Asn Ile  
530 535 540

Asp Ala Lys Met Glu Cys Arg Lys Ser His Glu Asn Pro Leu Ile Lys  
545 550 555 560

Gly Val Tyr Lys Glu Phe Leu Gly Lys Pro Asn Ser His Leu Ala His  
565 570 575

Glu Leu Leu His Thr His Phe Lys His His Pro Lys Trp  
580 585

<210> 99  
<211> 1206  
<212> PRT  
<213> Nyctotherus ovalis

<400> 99

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1 5 10 15

Phe Ala Thr Ser Glu Met Ile Ser Leu Lys Ile Asp Gly Lys Ile Ile  
20 25 30

Ser Val Pro Lys Gly Ile Met Leu Ala Asp Ala Ile Lys Lys Ala Gly  
35 40 45

Ala Asn Val Pro Thr Met Cys Tyr His Pro Asp Leu Pro Thr Ser Gly  
50 55 60

Gly Ile Cys Arg Val Cys Leu Val Glu Ser Ala Lys Ser Pro Gly Tyr  
65 70 75 80

Pro Ile Ile Ser Cys Arg Thr Pro Val Glu Glu Gly Met Glu Ile Val  
85 90 95

Thr Gln Gly Ser Lys Met Lys Glu Tyr Arg Gln Ala Asn Leu Ala Leu  
100 105 110

Met Leu Ser Arg His Pro Asn Ala Cys Leu Ser Cys Thr Ser Asn Thr  
115 120 125

Asn Cys Lys Thr Gln Glu Leu Ser Ala Asn Met Asn Ile Gly Gln Cys  
130 135 140

Gly Phe Ala Asn Ala Thr Pro Pro Lys Asn Asp Asp Ser Tyr Asp Met  
145 150 155 160

Thr Thr Ala Ile Glu Arg Asp Asn Asp Lys Cys Ile Asn Cys Asp Ile  
165 170 175

Cys Val His Thr Cys Ser Leu Gln Gly Leu Asn Ala Leu Gly Phe Tyr  
 180 185 190  
 Asn Glu Glu Gly His Ala Val Lys Ser Met Gly Thr Leu Asp Val Ser  
 195 200 205  
 Glu Cys Ile Gln Cys Gly Gln Cys Ile Asn Arg Cys Pro Thr Gly Ala  
 210 215 220  
 Ile Thr Glu Lys Ser Glu Ile Arg Pro Val Leu Asp Ala Ile Asn Ile  
 225 230 235 240  
 Gln Gln Arg Leu Val Phe Gln Met Ala Pro Ser Ile Arg Val Ala Val  
 245 250 255  
 Ala Glu Glu Phe Gly Ile Lys Pro Gly Glu Lys Ile Leu Lys Asn Glu  
 260 265 270  
 Ile Ala Thr Ala Leu Arg Lys Leu Gly Ser Asn Val Phe Val Leu Asp  
 275 280 285  
 Thr Asn Phe Ser Ala Asp Leu Thr Ile Ile Glu Glu Gly His Glu Leu  
 290 295 300  
 Ile Glu Arg Leu Tyr Arg Asn Val Thr Gly Lys Lys Leu Leu Gly Gly  
 305 310 315 320  
 Asp His Met Pro Ile Asp Leu Pro Met Leu Thr Ser Cys Cys Pro Gly  
 325 330 335  
 Trp Ile Met Phe Ile Glu Lys Asn Tyr Pro Asp Leu Leu Asn Asn Leu  
 340 345 350  
 Ser Thr Cys Lys Ser Pro Gln Gly Met Leu Gly Ala Leu Ile Lys Gly  
 355 360 365  
 Tyr Trp Ala Lys Asn Ile Lys Lys Met Asp Pro Lys Asp Ile Val Ser  
 370 375 380  
 Val Ser Ile Met Pro Cys Thr Ala Lys Lys Ala Glu Lys Glu Arg Pro  
 385 390 395 400  
 Gln Leu Arg Gly Asp Glu Gly Tyr Lys Asp Val Asp Tyr Ile Leu Thr  
 405 410 415  
 Thr Arg Glu Leu Ala Lys Met Leu Lys Gln Ser Asn Ile Asp Leu Ala  
 420 425 430  
 Lys Met Glu Pro Thr Pro Phe Asp Lys Val Met Ser Glu Gly Thr Gly  
 435 440 445

Ala Ala Val Ile Phe Gly Val Thr Gly Gly Val Met Glu Ala Ala Leu  
 450 455 460  
 Arg Thr Ala Asn Glu Val Ile Thr Gly Arg Glu Val Pro Phe Lys Asn  
 465 470 475 480  
 Leu Asn Ile Glu Ala Val Arg Gly Met Glu Gly Ile Arg Glu Ala Gly  
 485 490 495  
 Ile Lys Leu Glu Asn Val Leu Asp Lys Tyr Lys Ala Phe Glu Gly Val  
 500 505 510  
 Thr Val Lys Val Ala Ile Ala His Gly Pro Asn Asn Ala Arg Lys Val  
 515 520 525  
 Met Asp Ile Ile Lys Gln Ala Lys Glu Ser Gly Lys Pro Ala Pro Trp  
 530 535 540  
 His Phe Val Glu Val Met Ala Cys Pro Gly Gly Cys Ile Gly Gly Gly  
 545 550 555 560  
 Gly Gln Pro Lys Pro Thr Asn Leu Glu Ile Arg Gln Ala Arg Thr Gln  
 565 570 575  
 Leu Thr Phe Lys Glu Asp Met Asp Leu Pro Leu Arg Lys Ser His Asp  
 580 585 590  
 Asn Pro Glu Ile Lys Ala Ile Tyr Glu Asn Tyr Leu Lys Glu Pro Leu  
 595 600 605  
 Gly His Asn Ser His His Tyr Leu His Thr Thr Tyr Ser Ser Gln Lys  
 610 615 620  
 Val Arg Asp Met Asn Leu Tyr Asn Ala Asn Glu Ala Ala Gly Leu Asp  
 625 630 635 640  
 Glu Ile Leu Ala Lys Tyr Pro Lys Glu Lys Glu Tyr Leu Met Pro Ile  
 645 650 655  
 Ile Ile Glu Glu His Asp Lys Lys Gly Tyr Ile Ser Asp Pro Ser Ile  
 660 665 670  
 Val Lys Ile Ser Glu His Leu Gly Met Tyr Pro Ala Gln Ile Glu Ser  
 675 680 685  
 Ile Leu Ser Ser Tyr His Tyr Phe Pro Arg Glu His Thr Ile Ala Ile  
 690 695 700  
 Leu Met Ser Ile Cys Val His Cys His Asn Cys Met Met Lys Gly Gln  
 705 710 715 720  
 Gly Arg Leu Leu Lys Thr Ile Gln Glu Thr Tyr Asp Ile His Glu Thr  
 725 730 735

His Gly Gly Val Ala Lys Asp Gly Ser Phe Thr Leu His Thr Leu Asn  
 740 745 750  
 Trp Leu Gly Tyr Cys Val Asn Asp Ala Pro Ala Met Met Ile Lys Arg  
 755 760 765  
 Lys Gly Thr Asn Tyr Val Glu Thr Phe Thr Gly Leu Leu Gly Asp Asn  
 770 775 780  
 Ile Asp Gln Arg Leu Lys Ser Leu Lys Asn Leu Lys Lys Glu Leu Pro  
 785 790 795 800  
 Lys Trp Pro Lys Asn Asn Ile Arg Glu Met Lys Ser Gln Arg Asn Gly  
 805 810 815  
 Asn Ser Tyr Ser Cys Met Asn Thr Gln Ala Pro Ile Ala Glu Ala Thr  
 820 825 830  
 Lys Lys Ala Val Ser Met Gly Pro Glu Lys Val Ile Glu Glu Val Phe  
 835 840 845  
 Lys Ser Asn Leu Val Gly Arg Gly Gly Ala Gly Phe Arg Thr Gly Lys  
 850 855 860  
 Lys Trp Glu Ser Ala Tyr Lys Thr Pro Ala Ser Asp Lys Tyr Val Val  
 865 870 875 880  
 Cys Asn Ala Asp Glu Gly Leu Pro Ser Thr Tyr Lys Asp Trp Cys Leu  
 885 890 895  
 Leu Asn Asn Glu Ala Lys Arg Lys Glu Val Phe Thr Gly Met Gly Ile  
 900 905 910  
 Cys Ala Lys Thr Ile Gly Ala Lys Arg Cys Phe Met Tyr Leu Arg Tyr  
 915 920 925  
 Glu Tyr Arg Asn Leu Val Pro Ala Leu Glu Gln Ser Ile Lys Asp Val  
 930 935 940  
 Gln Ser Thr Cys Pro Glu Leu Ala Asp Leu Lys Tyr Glu Ile Arg Leu  
 945 950 955 960  
 Gly Gly Gly Pro Tyr Val Ala Gly Glu Glu Asn Ala Gln Phe Glu Ser  
 965 970 975  
 Ile Glu Gly Arg Ala Pro Leu Pro Arg Lys Asp Arg Pro Gly Asn Ile  
 980 985 990  
 Phe Pro Thr Met Glu Gly Leu Phe His Lys Pro Thr Val Ile Asn Asn  
 995 1000 1005

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Val Glu Thr Phe Phe Ala Ile Pro His Ile Ile Gln Gln Gly Ser  
1010 1015 1020

Gln Ser Phe Gly Glu Gly Lys Met Pro Lys Leu Leu Ser Val Thr  
1025 1030 1035

Gly Asp Val Asp Glu Pro Ile Leu Ile Glu Thr Asn Leu Asn Asn  
1040 1045 1050

Tyr Ser Leu Asn His Leu Leu Gln Glu Ile Ser Ala Lys Asp Ile  
1055 1060 1065

Val Ala Ala Glu Ile Gly Gly Cys Thr Glu Pro Ile Ile Phe Gly  
1070 1075 1080

Ser Lys Phe Asp Thr Leu Phe Gly Phe Gly Arg Gly Thr Leu Asn  
1085 1090 1095

Ala Val Gly Ser Val Val Leu Phe Asn Ser Ser Cys Asp Leu Gly  
1100 1105 1110

Lys Ile Tyr Glu Asn Lys Leu Lys Phe Met Ala Glu Glu Ser Cys  
1115 1120 1125

Lys Gln Cys Val Pro Cys Arg Asp Gly Ser Tyr Ile Phe His Arg  
1130 1135 1140

Ala Phe Lys Glu Leu Arg Asp Thr Gly Lys Ser Ser Tyr Asn Met  
1145 1150 1155

Arg Ala Leu Ala Val Ala Ser Glu Ser Ala Ala Arg Ser Ser Ile  
1160 1165 1170

Cys Ala His Gly Lys Ala Leu Glu Ser Leu Phe Lys Ser Ala Cys  
1175 1180 1185

Asp Phe Met Asn Lys Thr Lys Pro Ile Tyr Gln Pro His Ser Thr  
1190 1195 1200

Tyr His Gln  
1205

<210> 100  
<211> 468  
<212> PRT  
<213> T vaginalis  
  
<400> 100

Met Leu Ala Ser Ser Ala Thr Ala Met Lys Gly Phe Ala Asn Ser Leu  
1 5 10 15

Arg Met Lys Asp Tyr Ser Ser Thr Gly Ile Asn Phe Asp Met Thr Lys  
20 25 30



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Cys Ile Asn Cys Gln Ser Cys Val Arg Ala Cys Thr Asn Ile Ala Gly  
 35 40 45  
 Gln Asn Val Leu Lys Ser Leu Thr Val Asn Gly Lys Ser Val Val Gln  
 50 55 60  
 Thr Val Thr Gly Lys Pro Leu Ala Glu Thr Asn Cys Ile Ser Cys Gly  
 65 70 75 80  
 Gln Cys Thr Leu Gly Cys Pro Lys Phe Thr Ile Phe Glu Ala Asp Ala  
 85 90 95  
 Ile Asn Pro Val Lys Glu Val Leu Thr Lys Lys Asn Gly Arg Ile Ala  
 100 105 110  
 Val Cys Gln Ile Ala Pro Ala Ile Arg Ile Asn Met Ala Glu Ala Leu  
 115 120 125  
 Gly Val Pro Ala Gly Thr Ile Ser Leu Gly Lys Val Val Thr Ala Leu  
 130 135 140  
 Lys Arg Leu Gly Phe Asp Tyr Val Phe Asp Thr Asn Phe Ala Ala Asp  
 145 150 155 160  
 Met Thr Ile Val Glu Glu Ala Thr Glu Leu Val Gln Arg Leu Ser Asp  
 165 170 175  
 Lys Asn Ala Val Leu Pro Met Phe Thr Ser Cys Cys Pro Ala Trp Val  
 180 185 190  
 Asn Tyr Val Glu Lys Ser Asp Pro Ser Leu Ile Pro Tyr Leu Ser Ser  
 195 200 205  
 Cys Arg Ser Pro Met Ser Met Leu Ser Ser Val Ile Lys Asn Val Phe  
 210 215 220  
 Pro Lys Lys Ile Gly Thr Thr Ala Asp Lys Ile Tyr Asn Val Ala Ile  
 225 230 235 240  
 Met Pro Cys Thr Arg Lys Lys Asp Glu Ile Gln Arg Ser Gln Phe Thr  
 245 250 255  
 Met Lys Asp Gly Lys Gln Glu Thr Gly Ala Val Leu Thr Ser Arg Glu  
 260 265 270  
 Leu Ala Lys Met Ile Lys Glu Ala Lys Ile Asn Phe Lys Glu Leu Pro  
 275 280 285  
 Asp Thr Pro Cys Asp Asn Phe Tyr Ser Glu Ala Ser Gly Gly Gly Ala  
 290 295 300  
 Ile Phe Cys Ala Thr Gly Gly Val Met Glu Ala Ala Val Arg Ser Ala

305                      310                      315                      320  
 Tyr Lys Phe Leu Thr Lys Lys Glu Leu Ala Pro Ile Asp Leu Gln Asp  
                                  325                                   330                                   335  
 Val Arg Gly Val Ala Ser Gly Val Lys Leu Ala Glu Val Asp Ile Ala  
                                  340                                   345                                   350  
 Gly Thr Lys Val Lys Val Ala Val Ala His Gly Ile Lys Asn Ala Met  
                                  355                                   360                                   365  
 Thr Leu Ile Lys Lys Ile Lys Ser Gly Glu Glu Gln Phe Lys Asp Val  
                                  370                                   375                                   380  
 Lys Phe Val Glu Val Met Ala Cys Pro Gly Gly Cys Val Val Gly Gly  
                                  385                                   390                                   395                                   400  
 Gly Ser Pro Lys Ala Lys Thr Lys Lys Ala Val Gln Ala Arg Leu Asn  
                                  405                                   410                                   415  
 Ala Thr Tyr Ser Ile Asp Lys Ser Ser Lys His Arg Thr Ser Gln Asp  
                                  420                                   425                                   430  
 Asn Pro Gln Leu Leu Gln Leu Tyr Lys Glu Ser Phe Glu Gly Lys Phe  
                                  435                                   440                                   445  
 Gly Gly His Val Ala His His Leu Leu His Thr His Tyr Lys Asn Arg  
                                  450                                   455                                   460  
 Lys Val Asn Pro  
 465  
  
 <210> 101  
 <211> 582  
 <212> PRT  
 <213> C. acetobutylicum  
  
 <400> 101  
 Met Lys Thr Ile Ile Leu Asn Gly Asn Glu Val His Thr Asp Lys Asp  
 1                                   5                                   10                                   15  
 Ile Thr Ile Leu Glu Leu Ala Arg Glu Asn Asn Val Asp Ile Pro Thr  
                                  20                                   25                                   30  
 Leu Cys Phe Leu Lys Asp Cys Gly Asn Phe Gly Lys Cys Gly Val Cys  
                                  35                                   40                                   45  
 Met Val Glu Val Glu Gly Lys Gly Phe Arg Ala Ala Cys Val Ala Lys  
                                  50                                   55                                   60  
 Val Glu Asp Gly Met Val Ile Asn Thr Glu Ser Asp Glu Val Lys Glu  
 65                                   70                                   75                                   80

Arg Ile Lys Lys Arg Val Ser Met Leu Leu Asp Lys His Glu Phe Lys  
 85 90 95  
 Cys Gly Gln Cys Ser Arg Arg Glu Asn Cys Glu Phe Leu Lys Leu Val  
 100 105 110  
 Ile Lys Thr Lys Ala Lys Ala Ser Lys Pro Phe Leu Pro Glu Asp Lys  
 115 120 125  
 Asp Ala Leu Val Asp Asn Arg Ser Lys Ala Ile Val Ile Asp Arg Ser  
 130 135 140  
 Lys Cys Val Leu Cys Gly Arg Cys Val Ala Ala Cys Lys Gln His Thr  
 145 150 155 160  
 Ser Thr Cys Ser Ile Gln Phe Ile Lys Lys Asp Gly Gln Arg Ala Val  
 165 170 175  
 Gly Thr Val Asp Asp Val Cys Leu Asp Asp Ser Thr Cys Leu Leu Cys  
 180 185 190  
 Gly Gln Cys Val Ile Ala Cys Pro Val Ala Ala Leu Lys Glu Lys Ser  
 195 200 205  
 His Ile Glu Lys Val Gln Glu Ala Leu Asn Asp Pro Lys Lys His Val  
 210 215 220  
 Ile Val Ala Met Ala Pro Ser Val Arg Thr Ala Met Gly Glu Leu Phe  
 225 230 235 240  
 Lys Met Gly Tyr Gly Lys Asp Val Thr Gly Lys Leu Tyr Thr Ala Leu  
 245 250 255  
 Arg Met Leu Gly Phe Asp Lys Val Phe Asp Ile Asn Phe Gly Ala Asp  
 260 265 270  
 Met Thr Ile Met Glu Glu Ala Thr Glu Leu Leu Gly Arg Val Lys Asn  
 275 280 285  
 Asn Gly Pro Phe Pro Met Phe Thr Ser Cys Cys Pro Ala Trp Val Arg  
 290 295 300  
 Leu Ala Gln Asn Tyr His Pro Glu Leu Leu Asp Asn Leu Ser Ser Ala  
 305 310 315 320  
 Lys Ser Pro Gln Gln Ile Phe Gly Thr Ala Ser Lys Thr Tyr Tyr Pro  
 325 330 335  
 Ser Ile Ser Gly Ile Ala Pro Glu Asp Val Tyr Thr Val Thr Ile Met  
 340 345 350  
 Pro Cys Asn Asp Lys Lys Tyr Glu Ala Asp Ile Pro Phe Met Glu Thr  
 355 360 365

Asn Ser Leu Arg Asp Ile Asp Ala Ser Leu Thr Thr Arg Glu Leu Ala  
 370 375 380

Lys Met Ile Lys Asp Ala Lys Ile Lys Phe Ala Asp Leu Glu Asp Gly  
 385 390 395 400

Glu Val Asp Pro Ala Met Gly Thr Tyr Ser Gly Ala Gly Ala Ile Phe  
 405 410 415

Gly Ala Thr Gly Gly Val Met Glu Ala Ala Ile Arg Ser Ala Lys Asp  
 420 425 430

Phe Ala Glu Asn Lys Glu Leu Glu Asn Val Asp Tyr Thr Glu Val Arg  
 435 440 445

Gly Phe Lys Gly Ile Lys Glu Ala Glu Val Glu Ile Ala Gly Asn Lys  
 450 455 460

Leu Asn Val Ala Val Ile Asn Gly Ala Ser Asn Phe Phe Glu Phe Met  
 465 470 475 480

Lys Ser Gly Lys Met Asn Glu Lys Gln Tyr His Phe Ile Glu Val Met  
 485 490 495

Ala Cys Pro Gly Gly Cys Ile Asn Gly Gly Gly Gln Pro His Val Asn  
 500 505 510

Ala Leu Asp Arg Glu Asn Val Asp Tyr Arg Lys Leu Arg Ala Ser Val  
 515 520 525

Leu Tyr Asn Gln Asp Lys Asn Val Leu Ser Lys Arg Lys Ser His Asp  
 530 535 540

Asn Pro Ala Ile Ile Lys Met Tyr Asp Ser Tyr Phe Gly Lys Pro Gly  
 545 550 555 560

Glu Gly Leu Ala His Lys Leu Leu His Val Lys Tyr Thr Lys Asp Lys  
 565 570 575

Asn Val Ser Lys His Glu  
 580

<210> 102  
 <211> 574  
 <212> PRT  
 <213> Clostridium pasteurianum

<400> 102

Met Lys Thr Ile Ile Ile Asn Gly Val Gln Phe Asn Thr Asp Glu Asp  
 1 5 10 15

Thr Thr Ile Leu Lys Phe Ala Arg Asp Asn Asn Ile Asp Ile Ser Ala  
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Leu Cys Phe Leu Asn Asn Cys Asn Asn Asp Ile Asn Lys Cys Glu Ile  
 35 40 45  
 Cys Thr Val Glu Val Glu Gly Thr Gly Leu Val Thr Ala Cys Asp Thr  
 50 55 60  
 Leu Ile Glu Asp Gly Met Ile Ile Asn Thr Asn Ser Asp Ala Val Asn  
 65 70 75 80  
 Glu Lys Ile Lys Ser Arg Ile Ser Gln Leu Leu Asp Ile His Glu Phe  
 85 90 95  
 Lys Cys Gly Pro Cys Asn Arg Arg Glu Asn Cys Glu Phe Leu Lys Leu  
 100 105 110  
 Val Ile Lys Tyr Lys Ala Arg Ala Ser Lys Pro Phe Leu Pro Lys Asp  
 115 120 125  
 Lys Thr Glu Tyr Val Asp Glu Arg Ser Lys Ser Leu Thr Val Asp Arg  
 130 135 140  
 Thr Lys Cys Leu Leu Cys Gly Arg Cys Val Asn Ala Cys Gly Lys Asn  
 145 150 155 160  
 Thr Glu Thr Tyr Ala Met Lys Phe Leu Asn Lys Asn Gly Lys Thr Ile  
 165 170 175  
 Ile Gly Ala Glu Asp Glu Lys Cys Phe Asp Asp Thr Asn Cys Leu Leu  
 180 185 190  
 Cys Gly Gln Cys Ile Ile Ala Cys Pro Val Ala Ala Leu Ser Glu Lys  
 195 200 205  
 Ser His Met Asp Arg Val Lys Asn Ala Leu Asn Ala Pro Glu Lys His  
 210 215 220  
 Val Ile Val Ala Met Ala Pro Ser Val Arg Ala Ser Ile Gly Glu Leu  
 225 230 235 240  
 Phe Asn Met Gly Phe Gly Val Asp Val Thr Gly Lys Ile Tyr Thr Ala  
 245 250 255  
 Leu Arg Gln Leu Gly Phe Asp Lys Ile Phe Asp Ile Asn Phe Gly Ala  
 260 265 270  
 Asp Met Thr Ile Met Glu Glu Ala Thr Glu Leu Val Gln Arg Ile Glu  
 275 280 285  
 Asn Asn Gly Pro Phe Pro Met Phe Thr Ser Cys Cys Pro Gly Trp Val  
 290 295 300

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Arg Gln Ala Glu Asn Tyr Tyr Pro Glu Leu Leu Asn Asn Leu Ser Ser  
 305 310 315 320  
 Ala Lys Ser Pro Gln Gln Ile Phe Gly Thr Ala Ser Lys Thr Tyr Tyr  
 325 330 335  
 Pro Ser Ile Ser Gly Leu Asp Pro Lys Asn Val Phe Thr Val Thr Val  
 340 345 350  
 Met Pro Cys Thr Ser Lys Lys Phe Glu Ala Asp Arg Pro Gln Met Glu  
 355 360 365  
 Lys Asp Gly Leu Arg Asp Ile Asp Ala Val Ile Thr Thr Arg Glu Leu  
 370 375 380  
 Ala Lys Met Ile Lys Asp Ala Lys Ile Pro Phe Ala Lys Leu Glu Asp  
 385 390 395 400  
 Ser Glu Ala Asp Pro Ala Met Gly Glu Tyr Ser Gly Ala Gly Ala Ile  
 405 410 415  
 Phe Gly Ala Thr Gly Gly Val Met Glu Ala Ala Leu Arg Ser Ala Lys  
 420 425 430  
 Asp Phe Ala Glu Asn Ala Glu Leu Glu Asp Ile Glu Tyr Lys Gln Val  
 435 440 445  
 Arg Gly Leu Asn Gly Ile Lys Glu Ala Glu Val Glu Ile Asn Asn Asn  
 450 455 460  
 Lys Tyr Asn Val Ala Val Ile Asn Gly Ala Ser Asn Leu Phe Lys Phe  
 465 470 475 480  
 Met Lys Ser Gly Met Ile Asn Glu Lys Gln Tyr His Phe Ile Glu Val  
 485 490 495  
 Met Ala Cys His Gly Gly Cys Val Asn Gly Gly Gly Gln Pro His Val  
 500 505 510  
 Asn Pro Lys Asp Leu Glu Lys Val Asp Ile Lys Lys Val Arg Ala Ser  
 515 520 525  
 Val Leu Tyr Asn Gln Asp Glu His Leu Ser Lys Arg Lys Ser His Glu  
 530 535 540  
 Asn Thr Ala Leu Val Lys Met Tyr Gln Asn Tyr Phe Gly Lys Pro Gly  
 545 550 555 560  
 Glu Gly Arg Ala His Glu Ile Leu His Phe Lys Tyr Lys Lys  
 565 570

&lt;211&gt; 421

&lt;212&gt; PRT

&lt;213&gt; Desulfovibrio vulgaris

&lt;400&gt; 103

Met Ser Arg Thr Val Met Glu Arg Ile Glu Tyr Glu Met His Thr Pro  
 1 5 10 15

Asp Pro Lys Ala Asp Pro Asp Lys Leu His Phe Val Gln Ile Asp Glu  
 20 25 30

Ala Lys Cys Ile Gly Cys Asp Thr Cys Ser Gln Tyr Cys Pro Thr Ala  
 35 40 45

Ala Ile Phe Gly Glu Met Gly Glu Pro His Ser Ile Pro His Ile Glu  
 50 55 60

Ala Cys Ile Asn Cys Gly Gln Cys Leu Thr His Cys Pro Glu Asn Ala  
 65 70 75 80

Ile Tyr Glu Ala Gln Ser Trp Val Pro Glu Val Glu Lys Lys Leu Lys  
 85 90 95

Asp Gly Lys Val Lys Cys Ile Ala Met Pro Ala Pro Ala Val Arg Tyr  
 100 105 110

Ala Leu Gly Asp Ala Phe Gly Met Pro Val Gly Ser Val Thr Thr Gly  
 115 120 125

Lys Met Leu Ala Ala Leu Gln Lys Leu Gly Phe Ala His Cys Trp Asp  
 130 135 140

Thr Glu Phe Thr Ala Asp Val Thr Ile Trp Glu Glu Gly Ser Glu Phe  
 145 150 155 160

Val Glu Arg Leu Thr Lys Lys Ser Asp Met Pro Leu Pro Gln Phe Thr  
 165 170 175

Ser Cys Cys Pro Gly Trp Gln Lys Tyr Ala Glu Thr Tyr Tyr Pro Glu  
 180 185 190

Leu Leu Pro His Phe Ser Thr Cys Lys Ser Pro Ile Gly Met Asn Gly  
 195 200 205

Ala Leu Ala Lys Thr Tyr Gly Ala Glu Arg Met Lys Tyr Asp Pro Lys  
 210 215 220

Gln Val Tyr Thr Val Ser Ile Met Pro Cys Ile Ala Lys Lys Tyr Glu  
 225 230 235 240

Gly Leu Arg Pro Glu Leu Lys Ser Ser Gly Met Arg Asp Ile Asp Ala  
 245 250 255

Thr Leu Thr Thr Arg Glu Leu Ala Tyr Met Ile Lys Lys Ala Gly Ile  
260 265 270

Asp Phe Ala Lys Leu Pro Asp Gly Lys Arg Asp Ser Leu Met Gly Glu  
275 280 285

Ser Thr Gly Gly Ala Thr Ile Phe Gly Val Thr Gly Gly Val Met Glu  
290 295 300

Ala Ala Leu Arg Phe Ala Tyr Glu Ala Val Thr Gly Lys Lys Pro Asp  
305 310 315 320

Ser Trp Asp Phe Lys Ala Val Arg Gly Leu Asp Gly Ile Lys Glu Ala  
325 330 335

Thr Val Asn Val Gly Gly Thr Asp Val Lys Val Ala Val Val His Gly  
340 345 350

Ala Lys Arg Phe Lys Gln Val Cys Asp Asp Val Lys Ala Gly Lys Ser  
355 360 365

Pro Tyr His Phe Ile Glu Tyr Met Ala Cys Pro Gly Gly Cys Val Cys  
370 375 380

Gly Gly Gly Gln Pro Val Met Pro Gly Val Leu Glu Ala Met Asp Arg  
385 390 395 400

Thr Thr Thr Arg Leu Tyr Ala Gly Leu Lys Lys Arg Leu Ala Met Ala  
405 410 415

Ser Ala Asn Lys Ala  
420

<210> 104  
<211> 449  
<212> PRT  
<213> Trichomonas vaginalis

<400> 104

Met Leu Ala Ser Ser Ser Arg Ala Ala Ala Asn Ile Arg Trp Val Asp  
1 5 10 15

Thr Ser His Asn Ala Ile Ala Phe Asp Met His Lys Cys Ile Asn Cys  
20 25 30

Gln Ala Cys Val Arg Ala Cys Lys Asn Val Ala Gly Gln Ser Val Leu  
35 40 45

Lys Ser Val Lys Ile Asn Glu Gly Lys Lys Lys Gly Val Val Gln Thr  
50 55 60

Val Thr Gly Lys Leu Leu Ala Glu Thr Asn Cys Ile Gly Cys Gly Gln  
65 70 75 80



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Cys Thr Leu Val Cys Pro Thr Gln Ala Ile His Glu Lys Asp Ala Leu  
 85 90 95  
 Lys Gln Met Asn Asn Ile Phe Lys Asn Lys Gly Asp Arg Ile Leu Val  
 100 105 110  
 Cys Gln Ile Ala Pro Ala Ile Arg Ile Asn Met Arg Arg Pro Trp Cys  
 115 120 125  
 Ser Ser Arg Asn Ser Phe His Arg Gln Ser Arg Tyr Ser Pro Gln Arg  
 130 135 140  
 Leu Gly Phe Asp Tyr Val Phe Asp Thr Asn Phe Gly Ala Asp Leu Thr  
 145 150 155 160  
 Ile Val Glu Glu Ala Thr Glu Leu Leu Gln Arg Leu Asn Asp Pro Lys  
 165 170 175  
 Ala Val Leu Pro Met Phe Thr Ser Cys Cys Pro Ala Trp Val Asn Tyr  
 180 185 190  
 Val Glu Lys Ser Tyr Pro Gln Trp Met Pro His Leu Ser Thr Cys Arg  
 195 200 205  
 Ser Pro Ile Gly Met Leu Ser Ala Val Ile Lys Asn Val Phe Pro Lys  
 210 215 220  
 His Ile Gly Val Asp Pro Lys Arg Ile Phe Ser Val Gly Ile Met Pro  
 225 230 235 240  
 Cys Thr Ala Lys Lys Asp Glu Ala Ala Arg Glu Gln Leu Met Thr Lys  
 245 250 255  
 Ser Gly Leu His Glu Thr Asp Leu Asp Ile Thr Ser Arg Glu Leu Ala  
 260 265 270  
 Lys Met Ile Lys Ala Ala Lys Ile Asn Phe Lys Glu Leu Pro Asp Thr  
 275 280 285  
 Glu Leu Asp Ser Pro Tyr Ala Met Ala Thr Gly Gly Gly Ala Ile Phe  
 290 295 300  
 Cys Ala Thr Gly Gly Val Met Glu Ala Ala Val Arg Ser Ala Tyr Lys  
 305 310 315 320  
 Phe Ala Thr Gly Lys Glu Leu Ala Pro Ile Glu Phe Val Gln Val Arg  
 325 330 335  
 Gly Ala Glu Lys Gly Ile Lys Val Gly Thr Val Asp Ile Asn Gly Arg  
 340 345 350  
 Glu Ile Lys Val Ala Val Ala Gln Gly Val Lys Asn Ala Met Ser Leu

Ile Lys Lys Ile Glu Glu Gly Gln Asp Asp Val Lys Gly Val Val Phe  
370 375 380

Cys Glu Val Met Ala Cys Pro Gly Gly Cys Val Gly Gly Gly Gly Ser  
385 390 395 400

Pro Arg Ala Lys Thr Lys Ala Ala Met Asn Lys Arg Leu Asp Ala Thr  
405 410 415

Tyr Arg Ile Asp Arg Ala Ser Lys Tyr Arg Thr Pro Gln Asp Asn Thr  
420 425 430

Gln Leu Gln Asp Leu Tyr Asn Ala Thr Trp Val Val Ser Leu Val Met  
435 440 445

Asp

<210> 105  
<211> 645  
<212> PRT  
<213> T. maritima

<400> 105

Met Lys Ile Tyr Val Asp Gly Arg Glu Val Ile Ile Asn Asp Asn Glu  
1 5 10 15

Arg Asn Leu Leu Glu Ala Leu Lys Asn Val Gly Ile Glu Ile Pro Asn  
20 25 30

Leu Cys Tyr Leu Ser Glu Ala Ser Ile Tyr Gly Ala Cys Arg Met Cys  
35 40 45

Leu Val Glu Ile Asn Gly Gln Ile Thr Thr Ser Cys Thr Leu Lys Pro  
50 55 60

Tyr Glu Gly Met Lys Val Lys Thr Asn Thr Pro Glu Ile Tyr Glu Met  
65 70 75 80

Arg Arg Asn Ile Leu Glu Leu Ile Leu Ala Thr His Asn Arg Asp Cys  
85 90 95

Thr Thr Cys Asp Arg Asn Gly Ser Cys Lys Leu Gln Lys Tyr Ala Glu  
100 105 110

Asp Phe Gly Ile Arg Lys Ile Arg Phe Glu Ala Leu Lys Lys Glu His  
115 120 125

Val Arg Asp Glu Ser Ala Pro Val Val Arg Asp Thr Ser Lys Cys Ile  
130 135 140

Leu Cys Gly Asp Cys Val Arg Val Cys Glu Glu Ile Gln Gly Val Gly  
 145 150 155 160  
 Val Ile Glu Phe Ala Lys Arg Gly Phe Glu Ser Val Val Thr Thr Ala  
 165 170 175  
 Phe Asp Thr Pro Leu Ile Glu Thr Glu Cys Val Leu Cys Gly Gln Cys  
 180 185 190  
 Val Ala Tyr Cys Pro Thr Gly Ala Leu Ser Ile Arg Asn Asp Ile Asp  
 195 200 205  
 Lys Leu Ile Glu Ala Leu Glu Ser Asp Lys Ile Val Ile Gly Met Ile  
 210 215 220  
 Ala Pro Ala Val Arg Ala Ala Ile Gln Glu Glu Phe Gly Ile Asp Glu  
 225 230 235 240  
 Asp Val Ala Met Ala Glu Lys Leu Val Ser Phe Leu Lys Thr Ile Gly  
 245 250 255  
 Phe Asp Lys Val Phe Asp Val Ser Phe Gly Ala Asp Leu Val Ala Tyr  
 260 265 270  
 Glu Glu Ala His Glu Phe Tyr Glu Arg Leu Lys Lys Gly Glu Arg Leu  
 275 280 285  
 Pro Gln Phe Thr Ser Cys Cys Pro Ala Trp Val Lys His Ala Glu His  
 290 295 300  
 Thr Tyr Pro Gln Tyr Leu Gln Asn Leu Ser Ser Val Lys Ser Pro Gln  
 305 310 315 320  
 Gln Ala Leu Gly Thr Val Ile Lys Lys Ile Tyr Ala Arg Lys Leu Gly  
 325 330 335  
 Val Pro Glu Glu Lys Ile Phe Leu Val Ser Phe Met Pro Cys Thr Ala  
 340 345 350  
 Lys Lys Phe Glu Ala Glu Arg Glu Glu His Glu Gly Ile Val Asp Ile  
 355 360 365  
 Val Leu Thr Thr Arg Glu Leu Ala Gln Leu Ile Lys Met Ser Arg Ile  
 370 375 380  
 Asp Ile Asn Arg Val Glu Pro Gln Pro Phe Asp Arg Pro Tyr Gly Val  
 385 390 395 400  
 Ser Ser Gln Ala Gly Leu Gly Phe Gly Lys Ala Gly Gly Val Phe Ser  
 405 410 415  
 Cys Val Leu Ser Val Leu Asn Glu Glu Ile Gly Ile Glu Lys Val Asp  
 420 425 430

Val Lys Ser Pro Glu Asp Gly Ile Arg Val Ala Glu Val Thr Leu Lys  
 435 440 445

Asp Gly Thr Ser Phe Lys Gly Ala Val Ile Tyr Gly Leu Gly Lys Val  
 450 455 460

Lys Lys Phe Leu Glu Glu Arg Lys Asp Val Glu Ile Ile Glu Val Met  
 465 470 475 480

Ala Cys Asn Tyr Gly Cys Val Gly Gly Gly Gln Pro Tyr Pro Asn  
 485 490 495

Asp Ser Arg Ile Arg Glu His Arg Ala Lys Val Leu Arg Asp Thr Met  
 500 505 510

Gly Ile Lys Ser Leu Leu Thr Pro Val Glu Asn Leu Phe Leu Met Lys  
 515 520 525

Leu Tyr Glu Glu Asp Leu Lys Asp Glu His Thr Arg His Glu Ile Leu  
 530 535 540

His Thr Thr Tyr Arg Pro Arg Arg Arg Tyr Pro Glu Lys Asp Val Glu  
 545 550 555 560

Ile Leu Pro Val Pro Asn Gly Glu Lys Arg Thr Val Lys Val Cys Leu  
 565 570 575

Gly Thr Ser Cys Tyr Thr Lys Gly Ser Tyr Glu Ile Leu Lys Lys Leu  
 580 585 590

Val Asp Tyr Val Lys Glu Asn Asp Met Glu Gly Lys Ile Glu Val Leu  
 595 600 605

Gly Thr Phe Cys Val Glu Asn Cys Gly Ala Ser Pro Asn Val Ile Val  
 610 615 620

Asp Asp Lys Ile Ile Gly Gly Ala Thr Phe Glu Lys Val Leu Glu Glu  
 625 630 635 640

Leu Ser Lys Asn Gly  
 645

<210> 106  
 <211> 369  
 <212> PRT  
 <213> T vaginalis

<400> 106

Cys Asp Gly Lys Trp Leu Ala Pro Ala Cys Val Thr Thr Val Trp Asp  
 1 5 10 15

Gly Leu Lys Ile Asp Thr Lys Ser Lys Met Val Lys Glu Ser Val Glu  
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Asn Asn Leu Lys Glu Leu Leu Asp Cys His Asp Glu Thr Cys Ser Ser  
           35                          40                          45  
 Cys Val Ala Asn His Arg Cys Gln Phe Arg Asp Met Asn Val Ala Tyr  
           50                          55                          60  
 Ser Ile Lys Ala Glu Thr Lys Glu Glu Cys Ser Glu Glu Gly Ile Asp  
   65                          70                          75                          80  
 Glu Ser Thr Asn Ser Ile Arg Leu Asp Thr Ser Lys Cys Val Leu Cys  
                           85                          90                          95  
 Gly Arg Cys Ile Arg Ala Cys Glu Glu Val Ala Gly Gln Ser Ala Ile  
                          100                         105                         110  
 Ile Phe Gly Asn Arg Ala Lys His Met Arg Ile Gln Pro Thr Phe Gly  
          115                         120                         125  
 Gln Thr Leu Gln Asp Thr Ser Cys Ile Lys Cys Gly Gln Cys Thr Leu  
          130                         135                         140  
 Tyr Cys Pro Val Gly Ala Ile Thr Glu Lys Ser Gln Val Lys Gln Ala  
   145                         150                         155                         160  
 Leu Asp Ile Leu Ser Asn Lys Gly Lys Lys Ile Ser Val Ile Gln Val  
                          165                         170                         175  
 Ala Pro Ala Val Arg Val Ala Leu Ser Glu Ala Phe Gly Tyr Lys Glu  
                          180                         185                         190  
 Gly Ser Val Thr Thr Gly Lys Met Val Ser Ala Leu Lys Ala Leu Gly  
          195                         200                         205  
 Phe Asp Tyr Val Tyr Asp Thr Asn Tyr Ser Ala Asp Leu Thr Ile Val  
          210                         215                         220  
 Glu Glu Ala Gly Glu Leu Val Gln Arg Leu Lys Asn Pro Asn Ala Val  
   225                         230                         235                         240  
 Phe Pro Met Phe Thr Ser Cys Cys Pro Ala Trp Val Asn Tyr Val Glu  
                          245                         250                         255  
 Gln Ser Ala Pro Asp Phe Ile Pro Asn Leu Ser Ser Cys Arg Ser Pro  
                          260                         265                         270  
 Gln Gly Met Leu Ser Ser Leu Val Lys Asn Tyr Leu Pro Lys Val Leu  
          275                         280                         285  
 Asn Ile Pro Val Glu Asp Val Leu Asn Phe Ser Ile Met Pro Cys Thr  
          290                         295                         300

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Ala Lys Lys Asp Glu Ile Glu Arg Pro Glu Leu Arg Thr Lys Asp Gly  
305 310 315 320

His Lys Glu Thr Asp Met Val Leu Thr Val Arg Glu Leu Val Glu Met  
325 330 335

Ile Lys Leu Ser Gly Ile Asp Phe Asn Asn Leu Pro Asp Thr Pro Phe  
340 345 350

Asp Ser Ile Phe Gly Phe Gly Ser Gly Ala Gly Gln Ile Phe Ala Ala  
355 360 365

Thr

<210> 107  
<211> 476  
<212> PRT  
<213> R. norvegicus

<400> 107

Met Ala Ser Pro Phe Ser Gly Ala Leu Gln Leu Thr Asp Leu Asp Asp  
1 5 10 15

Phe Ile Gly Pro Ser Gln Ser Cys Ile Lys Pro Val Thr Val Ala Lys  
20 25 30

Lys Pro Gly Ser Gly Ile Ala Lys Ile His Ile Glu Asp Asp Gly Ser  
35 40 45

Tyr Phe Gln Val Asn Pro Asp Gly Arg Ser Gln Lys Leu Glu Lys Ala  
50 55 60

Lys Val Ser Leu Asn Asp Cys Leu Ala Cys Ser Gly Cys Val Thr Ser  
65 70 75 80

Ala Glu Thr Ile Leu Ile Thr Gln Gln Ser His Glu Glu Leu Arg Lys  
85 90 95

Val Leu Asp Ala Asn Lys Val Ala Ala Pro Gly Gln Gln Arg Leu Val  
100 105 110

Val Val Ser Val Ser Pro Gln Ser Arg Ala Ser Leu Ala Ala Arg Phe  
115 120 125

Gln Leu Asp Ser Thr Asp Thr Ala Arg Lys Leu Thr Ser Phe Phe Lys  
130 135 140

Lys Ile Gly Val His Phe Val Phe Asp Thr Ala Phe Ala Arg Asn Phe  
145 150 155 160

Ser Leu Leu Glu Ser Gln Lys Glu Phe Val Gln Arg Phe Arg Glu Gln  
165 170 175

Ala Asn Ser Arg Glu Ala Leu Pro Met Leu Ala Ser Ala Cys Pro Gly  
 180 185 190  
 Trp Ile Cys Tyr Ala Glu Lys Thr His Gly Asn Phe Ile Leu Pro Tyr  
 195 200 205  
 Ile Ser Thr Ala Arg Ser Pro Gln Gln Val Met Gly Ser Leu Ile Lys  
 210 215 220  
 Asp Phe Phe Ala Gln Gln Gln Leu Leu Thr Pro Asp Lys Ile Tyr His  
 225 230 235 240  
 Val Thr Val Met Pro Cys Tyr Asp Lys Lys Leu Glu Ala Ser Arg Pro  
 245 250 255  
 Asp Phe Phe Asn Gln Glu Tyr Gln Thr Arg Asp Val Asp Cys Val Leu  
 260 265 270  
 Thr Thr Gly Glu Val Phe Arg Leu Leu Glu Glu Glu Gly Val Ser Leu  
 275 280 285  
 Ser Glu Leu Glu Pro Val Pro Leu Asp Gly Leu Thr Arg Ser Val Ser  
 290 295 300  
 Ala Glu Glu Pro Thr Ser His Arg Gly Gly Gly Ser Gly Gly Tyr Leu  
 305 310 315 320  
 Glu His Val Phe Arg His Ala Ala Gln Glu Leu Phe Gly Ile His Val  
 325 330 335  
 Ala Asp Val Thr Tyr Gln Pro Met Arg Asn Lys Asp Phe Gln Glu Val  
 340 345 350  
 Thr Leu Glu Arg Glu Gly Gln Val Leu Leu Arg Phe Ala Val Ala Tyr  
 355 360 365  
 Gly Phe Arg Asn Ile Gln Asn Leu Val Gln Lys Leu Lys Arg Gly Arg  
 370 375 380  
 Cys Pro Tyr His Tyr Val Glu Val Met Ala Cys Pro Ser Gly Cys Leu  
 385 390 395 400  
 Asn Gly Gly Gly Gln Leu Lys Ala Pro Asp Thr Glu Gly Arg Glu Leu  
 405 410 415  
 Leu Gln Gln Val Glu Arg Leu Tyr Ser Met Val Arg Thr Glu Ala Pro  
 420 425 430  
 Glu Asp Ala Pro Gly Val Gln Glu Leu Tyr Gln His Trp Leu Gln Gly  
 435 440 445

Glu Asp Ser Glu Arg Ala Ser His Leu Leu His Thr Gln Tyr His Ala  
 450 455 460

Val Glu Lys Ile Asn Ser Gly Leu Ser Ile Arg Trp  
 465 470 475

<210> 108  
 <211> 525  
 <212> PRT  
 <213> S. cerevisiae

<400> 108

Met Ala Ser Pro Phe Ser Gly Ala Leu Gln Leu Thr Asp Leu Asp Asp  
 1 5 10 15

Phe Ile Gly Pro Ser Gln Val Gly Ser Leu Gln Ala Leu Leu Ala Leu  
 20 25 30

Ala Phe Leu His Thr Gly Asn Phe Ser Ala Ala Gly Cys Trp Glu Pro  
 35 40 45

Asp Pro Trp Glu Cys Ile Lys Pro Val Lys Val Glu Lys Arg Ala Gly  
 50 55 60

Ser Gly Val Ala Lys Ile Arg Ile Glu Asp Asp Gly Ser Tyr Phe Gln  
 65 70 75 80

Ile Asn Gln Glu Lys Leu Gly Glu Leu Glu Leu Glu Pro Thr Phe Gly  
 85 90 95

Ile Phe Leu Pro Tyr Ser Pro Asp Gly Gly Thr Arg Arg Leu Glu Lys  
 100 105 110

Ala Lys Val Ser Leu Asn Asp Cys Leu Ala Cys Ser Gly Cys Ile Thr  
 115 120 125

Ser Ala Glu Thr Val Leu Ile Thr Gln Gln Ser His Glu Glu Leu Lys  
 130 135 140

Lys Val Leu Asp Ala Asn Lys Met Ala Ala Pro Ser Gln Gln Arg Leu  
 145 150 155 160

Val Val Val Ser Val Ser Pro Gln Ser Arg Ala Ser Leu Ala Ala Arg  
 165 170 175

Phe Gln Leu Asn Pro Thr Asp Thr Ala Arg Lys Leu Thr Ser Phe Phe  
 180 185 190

Lys Lys Ile Gly Val His Phe Val Phe Asp Thr Ala Phe Ser Arg His  
 195 200 205

Phe Ser Leu Leu Glu Ser Gln Arg Glu Phe Val Arg Arg Phe Arg Gly  
 210 215 220



061010 third listing.txt

Gln Ala Asp Cys Arg Gln Ala Leu Pro Leu Leu Ala Ser Ala Cys Pro  
225 230 235 240

Gly Trp Ile Cys Tyr Ala Glu Lys Thr His Gly Ser Phe Ile Leu Pro  
245 250 255

His Ile Ser Thr Ala Arg Ser Pro Gln Gln Val Met Gly Ser Leu Val  
260 265 270

Lys Asp Phe Phe Ala Gln Gln Gln His Leu Thr Pro Asp Lys Ile Tyr  
275 280 285

His Val Thr Val Met Pro Cys Tyr Asp Lys Lys Leu Glu Ala Ser Arg  
290 295 300

Pro Asp Phe Phe Asn Gln Glu His Gln Thr Arg Asp Val Asp Cys Val  
305 310 315 320

Leu Thr Thr Gly Glu Val Phe Arg Leu Leu Glu Glu Glu Gly Val Ser  
325 330 335

Leu Pro Asp Leu Glu Pro Ala Pro Leu Asp Ser Leu Cys Ser Gly Ala  
340 345 350

Ser Ala Glu Glu Pro Thr Ser His Arg Gly Gly Gly Ser Gly Gly Tyr  
355 360 365

Leu Glu His Val Phe Arg His Ala Ala Arg Glu Leu Phe Gly Ile His  
370 375 380

Val Ala Glu Val Thr Tyr Lys Pro Leu Arg Asn Lys Asp Phe Gln Glu  
385 390 395 400

Val Thr Leu Glu Lys Glu Gly Gln Val Leu Leu His Phe Ala Met Ala  
405 410 415

Tyr Gly Phe Arg Asn Ile Gln Asn Leu Val Gln Arg Leu Lys Arg Gly  
420 425 430

Arg Cys Pro Tyr His Tyr Val Glu Val Met Ala Cys Pro Ser Gly Cys  
435 440 445

Leu Asn Gly Gly Gly Gln Leu Gln Ala Pro Asp Arg Pro Ser Arg Glu  
450 455 460

Leu Leu Gln His Val Glu Arg Leu Tyr Gly Met Val Arg Ala Glu Ala  
465 470 475 480

Pro Glu Asp Ala Pro Gly Val Gln Glu Leu Tyr Thr His Trp Leu Gln  
485 490 495

Gly Thr Asp Ser Glu Cys Ala Gly Arg Leu Leu His Thr Gln Tyr His

Ala Val Glu Lys Ala Ser Thr Gly Leu Gly Ile Arg Trp  
515 520 525

<210> 109  
<211> 572  
<212> PRT  
<213> C. perfringens

<400> 109

Met Asn Lys Ile Ile Ile Asn Asp Lys Thr Ile Glu Phe Asp Gly Asp  
1 5 10 15

Lys Thr Ile Leu Asp Leu Ala Arg Glu Asn Gly Phe Asp Ile Pro Val  
20 25 30

Leu Cys Glu Leu Lys Asn Cys Gly Asn Lys Gly Gln Cys Gly Val Cys  
35 40 45

Leu Val Glu Gln Glu Gly Asn Asp Arg Leu Leu Arg Ser Cys Ala Ile  
50 55 60

Lys Ala Lys Asp Gly Met Val Ile Lys Thr Asp Ser Glu Lys Val Leu  
65 70 75 80

Glu Ala Arg Lys Glu Arg Val Ala Glu Leu Leu Asp Glu His Glu Phe  
85 90 95

Lys Cys Gly Pro Cys Lys Arg Arg Glu Asn Cys Glu Phe Leu Lys Leu  
100 105 110

Val Ile Lys Thr Lys Ala Arg Ala His Lys Pro Phe Val Val Ala Asp  
115 120 125

Lys Ser Glu Tyr Val Asp Asp Arg Ser Lys Ser Ile Val Leu Asp Arg  
130 135 140

Ser Lys Cys Val Lys Cys Gly Arg Cys Val Ala Ala Cys Arg Thr Arg  
145 150 155 160

Thr Ala Thr Asn Ser Ile Lys Phe His Arg Ile Asp Gly Val Arg Leu  
165 170 175

Val Gly Pro Glu Glu Leu Lys Cys Phe Asp Asp Thr Asn Cys Leu Leu  
180 185 190

Cys Gly Gln Cys Ile Ala Ala Cys Pro Val Asp Ala Leu Ser Glu Lys  
195 200 205

Ser His Ile Glu Arg Val Gln Asp Ala Leu Asn Asp Pro Glu Lys His  
210 215 220

Val Ile Val Ala Met Ala Pro Ala Val Arg Thr Ser Met Gly Glu Leu  
 225 230 235 240  
  
 Phe Lys Met Gly Tyr Gly Gln Asp Val Thr Gly Lys Leu Tyr Thr Ala  
 245 250 255  
  
 Leu Arg Glu Leu Gly Phe Asp Lys Val Phe Asp Ile Asn Phe Gly Ala  
 260 265 270  
  
 Asp Met Thr Ile Met Glu Glu Ala Thr Glu Leu Ile Glu Arg Ile Lys  
 275 280 285  
  
 Asn Asn Gly Pro Phe Pro Met Leu Thr Ser Cys Cys Pro Ser Trp Val  
 290 295 300  
  
 Arg Glu Val Glu Asn Tyr Phe Pro Glu Leu Val Glu Asn Leu Ser Ser  
 305 310 315 320  
  
 Ala Lys Ser Pro Gln Gln Ile Phe Gly Ala Ala Ser Lys Thr Tyr Tyr  
 325 330 335  
  
 Pro Gln Val Ala Asp Ile Asp Pro Lys Lys Val Phe Thr Val Thr Val  
 340 345 350  
  
 Met Pro Cys Thr Ser Lys Lys Phe Glu Ala Asp Arg Pro Glu Met Glu  
 355 360 365  
  
 Asn Glu Gly Ile Arg Asn Ile Asp Ala Val Ile Thr Thr Arg Glu Leu  
 370 375 380  
  
 Ala Arg Met Ile Lys Ala Ala Lys Ile Asp Phe Ala Lys Leu Glu Asp  
 385 390 395 400  
  
 Gly Glu Val Asp Pro Ala Met Gly Glu Tyr Thr Gly Ala Gly Val Ile  
 405 410 415  
  
 Phe Gly Ala Thr Gly Gly Val Met Glu Ala Ala Leu Arg Thr Ala Lys  
 420 425 430  
  
 Asp Phe Met Glu Asn Asp Asn Leu Asp Asn Val Asp Tyr Glu Ala Val  
 435 440 445  
  
 Arg Gly Leu Ala Gly Ile Lys Glu Ala Glu Val Glu Ile Ala Gly Asn  
 450 455 460  
  
 Glu Tyr Lys Leu Ala Val Val Ser Gly Ala Ala Asn Val Phe Glu Leu  
 465 470 475 480  
  
 Val Lys Ser Gly Lys Ile Asn Asp Tyr His Phe Ile Glu Val Met Ala  
 485 490 495  
  
 Cys Pro Gly Gly Cys Val Asn Gly Gly Gly Gln Pro His Ile Ser Ala  
 500 505 510

061010 third listing.txt

Glu Asp Ser Asp Lys Ile Asp Ile Arg Glu Val Arg Ala Ser Val Leu  
515 520 525

Tyr Asn Gln Asp Lys Asn Leu Glu Lys Arg Lys Ser His Gln Asn Ser  
530 535 540

Ala Leu Leu Lys Met Tyr Glu Asn Tyr Met Gly Lys Pro Gly His Gly  
545 550 555 560

Arg Ala His Glu Leu Leu His Met Lys Tyr Lys Lys  
565 570

<210> 110  
<211> 572  
<212> PRT  
<213> C. perfringens

<400> 110

Met Asn Lys Ile Ile Ile Asn Asp Lys Thr Ile Glu Phe Asp Gly Asp  
1 5 10 15

Lys Thr Ile Leu Asp Leu Ala Arg Glu Asn Gly Phe Asp Ile Pro Val  
20 25 30

Leu Cys Glu Leu Lys Asn Cys Gly Asn Lys Gly Gln Cys Gly Val Cys  
35 40 45

Leu Val Glu Gln Glu Gly Asn Asp Arg Leu Leu Arg Ser Cys Ala Ile  
50 55 60

Lys Ala Lys Asp Gly Met Val Ile Lys Thr Asp Ser Glu Lys Val Leu  
65 70 75 80

Glu Ala Arg Lys Glu Arg Val Ala Glu Leu Leu Asp Glu His Glu Phe  
85 90 95

Lys Cys Gly Pro Cys Lys Arg Arg Glu Asn Cys Glu Phe Leu Lys Leu  
100 105 110

Val Ile Lys Thr Lys Ala Arg Ala His Lys Pro Phe Val Val Ala Asp  
115 120 125

Lys Ser Glu Tyr Val Asp Asp Arg Ser Lys Ser Ile Val Leu Asp Arg  
130 135 140

Ser Lys Cys Val Lys Cys Gly Arg Cys Val Ala Ala Cys Arg Thr Arg  
145 150 155 160

Thr Ala Thr Asn Ser Ile Lys Phe His Arg Ile Asp Gly Val Arg Leu  
165 170 175

Val Gly Pro Glu Glu Leu Lys Cys Phe Asp Asp Thr Asn Cys Leu Leu

180

185

190

Cys Gly Gln Cys Ile Ala Ala Cys Pro Val Asp Ala Leu Ser Glu Lys  
 195 200 205

Ser His Ile Glu Arg Val Gln Glu Ala Leu Asn Asp Pro Glu Lys His  
 210 215 220

Val Ile Val Ala Met Ala Pro Ala Val Arg Thr Ser Met Gly Glu Leu  
 225 230 235 240

Phe Lys Met Gly Tyr Gly Gln Asp Val Thr Gly Lys Leu Tyr Thr Ala  
 245 250 255

Leu Arg Glu Leu Gly Phe Asp Lys Val Phe Asp Ile Asn Phe Gly Ala  
 260 265 270

Asp Met Thr Ile Met Glu Glu Ala Thr Glu Leu Ile Glu Arg Ile Lys  
 275 280 285

Asn Asn Gly Pro Phe Pro Met Leu Thr Ser Cys Cys Pro Ser Trp Val  
 290 295 300

Arg Glu Val Glu Asn Tyr Phe Pro Glu Leu Val Glu Asn Leu Ser Ser  
 305 310 315 320

Ala Lys Ser Pro Gln Gln Ile Phe Gly Ala Ala Ser Lys Thr Tyr Tyr  
 325 330 335

Pro Gln Val Ala Asp Ile Asp Pro Lys Lys Val Phe Thr Val Thr Val  
 340 345 350

Met Pro Cys Thr Ser Lys Lys Phe Glu Ala Asp Arg Pro Glu Met Glu  
 355 360 365

Asn Glu Gly Ile Arg Asn Ile Asp Ala Val Ile Thr Thr Arg Glu Leu  
 370 375 380

Ala Arg Met Ile Lys Ala Ala Lys Ile Asp Phe Ala Lys Leu Glu Asp  
 385 390 395 400

Gly Glu Val Asp Pro Ala Met Gly Glu Tyr Thr Gly Ala Gly Val Ile  
 405 410 415

Phe Gly Ala Thr Gly Gly Val Met Glu Ala Ala Leu Arg Thr Ala Lys  
 420 425 430

Asp Phe Met Glu Asn Asp Asn Leu Asp Asn Val Asp Tyr Glu Ala Val  
 435 440 445

Arg Gly Leu Ala Gly Ile Lys Glu Ala Glu Val Glu Ile Ala Gly Asn  
 450 455 460

061010 third listing.txt

Glu Tyr Lys Leu Ala Val Val Ser Gly Ala Ala Asn Val Phe Glu Leu  
 465 470 475 480  
 Val Lys Ser Gly Lys Ile Asn Asp Tyr His Phe Ile Glu Val Met Ala  
 485 490 495  
 Cys Pro Gly Gly Cys Val Asn Gly Gly Gly Gln Pro His Ile Ser Ala  
 500 505 510  
 Glu Asp Ser Asp Lys Met Asp Ile Arg Glu Val Arg Ala Ser Val Leu  
 515 520 525  
 Tyr Asn Gln Asp Lys Asn Leu Glu Lys Arg Lys Ser His Gln Asn Ser  
 530 535 540  
 Ala Leu Leu Lys Met Tyr Glu Ser Tyr Met Gly Lys Pro Gly His Gly  
 545 550 555 560  
 Arg Ala His Glu Leu Leu His Met Lys Tyr Lys Lys  
 565 570  
 <210> 111  
 <211> 494  
 <212> PRT  
 <213> C. tetani  
 <400> 111  
 Met Ile Val Phe Glu Asn Gln Leu Lys Lys Leu Lys Tyr Leu Val Leu  
 1 5 10 15  
 Lys Glu Val Ala Lys Met Thr Leu Glu Asp Arg Leu Gly Glu Glu Asp  
 20 25 30  
 Ile Glu Arg Ile Ser Phe Asp Ile Ile Lys Gly Asp Lys Ala Glu Tyr  
 35 40 45  
 Arg Cys Cys Val Tyr Lys Glu Arg Ala Ile Val Tyr Glu Arg Ala Lys  
 50 55 60  
 Leu Ala Thr Gly Cys Leu Pro Asn Gly Gln Val Ala Glu Glu Phe Val  
 65 70 75 80  
 His Val Glu Asp Asp Asp Gln Ile Ile Tyr Val Ile Asp Ala Ala Cys  
 85 90 95  
 Asp Lys Cys Pro Ile Asn Lys Tyr Val Val Thr Glu Ala Cys Arg Gly  
 100 105 110  
 Cys Leu Gln His Lys Cys Met Glu Val Cys Pro Ala Gly Ser Ile Asn  
 115 120 125  
 Arg Ala Ala Gly Lys Ala Tyr Ile Asn His Glu Thr Cys Lys Glu Cys  
 130 135 140

Gly Leu Cys Glu Ser Ala Cys Pro Tyr Asn Ala Ile Ala Glu Val Met  
 145 150 155 160  
 Arg Pro Cys Arg Arg Ala Cys Pro Thr Gly Ala Leu Gln Met Asn Leu  
 165 170 175  
 Glu Asp Asn Lys Ala Thr Ile Asn Lys Glu Asp Cys Ile Asn Cys Gly  
 180 185 190  
 Ser Cys Met Ser Val Cys Pro Phe Gly Ala Ile Ser Asp Lys Ser Tyr  
 195 200 205  
 Ile Val Asp Ile Thr Lys Ala Leu Lys Asn Asn Lys Lys Val Tyr Ala  
 210 215 220  
 Met Val Ala Pro Ala Ile Thr Gly Gln Phe Gly Lys Asp Val Ser Val  
 225 230 235 240  
 Gly Lys Met Lys Asn Ala Phe Lys Ala Met Gly Phe Glu Asp Met Leu  
 245 250 255  
 Glu Val Ala Cys Gly Ala Asp Ala Val Ala Ala His Glu Ser Glu Glu  
 260 265 270  
 Phe Ile Glu Arg Leu Glu Ser Gly Lys Lys Tyr Met Thr Thr Ser Cys  
 275 280 285  
 Cys Pro Gly Phe Leu Gly Tyr Ile Glu Lys Lys Phe Pro Asp Gln Leu  
 290 295 300  
 Glu Asn Val Ser Asn Thr Val Ser Pro Met Val Ala Ile Gly Arg Met  
 305 310 315 320  
 Ile Lys Lys Glu Tyr Glu Asp Ser Val Val Val Phe Val Gly Pro Cys  
 325 330 335  
 Thr Ala Lys Lys Ala Glu Ile Lys Arg Lys Gly Ile Lys Asp Ala Val  
 340 345 350  
 Asp Tyr Val Met Thr Phe Glu Glu Ile Ala Ala Leu Met Gly Ala Phe  
 355 360 365  
 Glu Ile Asp Pro Ala Glu Cys Glu Glu Glu Asp Ile Asn Asp Gly Ser  
 370 375 380  
 Asn Tyr Gly Arg Gly Phe Ala Gln Gly Gly Gly Val Val Ser Ala Ile  
 385 390 395 400  
 Gln Asn Cys Ile Lys Asp Lys Glu Gly Ile Lys Phe Asn Pro Leu Arg  
 405 410 415

Val Ser Gly Pro Asp Gln Ile Lys Arg Ala Met Ile Met Ala Lys Val  
 420 425 430

Gly Lys Leu Ser Glu Asn Phe Ile Glu Gly Met Met Cys Glu Gly Gly  
 435 440 445

Cys Ile Gly Gly Pro Ala Thr Met Val Ser Ala Val Lys Ala Lys Ala  
 450 455 460

Pro Leu Met Lys Phe Ser Lys Ser Ser Thr Ile Lys Asp Val Lys Asp  
 465 470 475 480

Asn Glu Val Leu Asp Lys Tyr Lys Asp Ile Asn Met Glu Arg  
 485 490

<210> 112  
 <211> 448  
 <212> PRT  
 <213> C. tetani

<400> 112

Met His Asn Asp Tyr Arg Glu Ile Phe Lys Arg Leu Ser Lys Ser Tyr  
 1 5 10 15

Tyr Asp Asp Thr Phe Glu Lys Glu Val Glu Asn Ile Leu Ser Ser His  
 20 25 30

Ser Met Asp Arg Glu Lys Leu Ala Lys Ile Ile Ser Ile Leu Cys Gly  
 35 40 45

Val Asn Ile Glu His Ser Glu Asn Tyr Ile Ser Asn Leu Lys Asn Ala  
 50 55 60

Ile Lys Asn Tyr Thr Ala Ser Ala Glu Lys Val Val Thr Lys Leu Pro  
 65 70 75 80

Cys Ser Thr Gln Cys Ala Lys Asp Gly Asp Ile Ile Cys Glu Lys Ser  
 85 90 95

Cys Pro Val Asn Ala Ile Phe Arg Asp Pro Asn Asp Asn Asn Ile Tyr  
 100 105 110

Ile Asn Asp Glu Leu Cys Leu Asp Cys Gly Leu Cys Val Arg Asn Cys  
 115 120 125

Pro Ser Gly Ser Ile Leu Asp Lys Lys Glu Phe Ile Pro Leu Ala Glu  
 130 135 140

Leu Leu Lys Ser Glu Ser Ile Val Ile Ala Ala Val Ala Pro Ala Ile  
 145 150 155 160

Met Gly Gln Phe Gly Glu Asn Thr Thr Ile Asn Gln Leu Arg Thr Ala  
 165 170 175



061010 third listing.txt

Phe Lys Lys Leu Gly Phe Thr Asp Met Val Glu Val Ala Phe Phe Ala  
 180 185 190  
 Asp Met Leu Thr Leu Lys Glu Ala Val Glu Tyr Asp His Phe Val Lys  
 195 200 205  
 Asp Glu Gln Asp Phe Met Ile Thr Ser Cys Cys Cys Pro Met Trp Val  
 210 215 220  
 Gly Met Leu Lys Lys Val Tyr Asn Asp Leu Val Lys Tyr Val Ser Pro  
 225 230 235 240  
 Ser Val Ser Pro Met Ile Ala Ala Gly Arg Val Leu Lys Leu Leu Asn  
 245 250 255  
 Pro Asn Cys Lys Val Val Phe Val Gly Pro Cys Ile Ala Lys Lys Ala  
 260 265 270  
 Glu Ala Arg Glu Lys Asp Leu Leu Gly Asp Ile Asp Phe Val Leu Thr  
 275 280 285  
 Phe Thr Glu Leu Arg Asp Ile Phe Asp Val Phe Asp Ile Gln Pro Glu  
 290 295 300  
 Asn Leu Glu Glu Asp Phe Ser Ser Glu Tyr Ala Ser Lys Gly Gly Arg  
 305 310 315 320  
 Leu Tyr Ala Arg Thr Gly Gly Val Ser Ile Ala Val Ser Glu Ala Ile  
 325 330 335  
 Glu Lys Leu Phe Pro Asn Lys Tyr Lys Phe Leu Lys Thr Ile Gln Ala  
 340 345 350  
 Asp Gly Val Lys Gly Cys Lys Ser Leu Leu Asp Lys Ile Lys Gln Glu  
 355 360 365  
 Asp Ile Ser Ala Asn Phe Val Glu Gly Met Gly Cys Val Gly Gly Cys  
 370 375 380  
 Val Gly Gly Pro Lys Val Ile Ile Asp Pro Ser Glu Gly Arg Asn Ala  
 385 390 395 400  
 Val Asn Asn Phe Ala Glu Asn Ser Ser Ile Lys Val Ser Val Asp Ser  
 405 410 415  
 Asn Cys Met Asn Asp Ile Leu Ser Lys Ile Asn Ile Asn Ser Val Glu  
 420 425 430  
 Asp Phe Lys Asp Lys Asp Lys Ile Ser Ile Phe Glu Arg Glu Phe Lys  
 435 440 445

<211> 261  
 <212> PRT  
 <213> *Pyrococcus furiosus*

<400> 113

Met Gly Lys Val Arg Ile Gly Phe Tyr Ala Leu Thr Ser Cys Tyr Gly  
 1 5 10 15

Cys Gln Leu Gln Leu Ala Met Met Asp Glu Leu Leu Gln Leu Ile Pro  
 20 25 30

Asn Ala Glu Ile Val Cys Trp Phe Met Ile Asp Arg Asp Ser Ile Glu  
 35 40 45

Asp Glu Lys Val Asp Ile Ala Phe Ile Glu Gly Ser Val Ser Thr Glu  
 50 55 60

Glu Glu Val Glu Leu Val Lys Lys Ile Arg Glu Asn Ala Lys Ile Val  
 65 70 75 80

Val Ala Val Gly Ala Cys Ala Val Gln Gly Gly Val Gln Ser Trp Ser  
 85 90 95

Glu Lys Pro Leu Glu Glu Leu Trp Lys Lys Val Tyr Gly Asp Ala Lys  
 100 105 110

Val Lys Phe Gln Pro Lys Lys Ala Glu Pro Val Ser Lys Tyr Ile Lys  
 115 120 125

Val Asp Tyr Asn Ile Tyr Gly Cys Pro Pro Glu Lys Lys Asp Phe Leu  
 130 135 140

Tyr Ala Leu Gly Thr Phe Leu Ile Gly Ser Trp Pro Glu Asp Ile Asp  
 145 150 155 160

Tyr Pro Val Cys Leu Glu Cys Arg Leu Asn Gly His Pro Cys Ile Leu  
 165 170 175

Leu Glu Lys Gly Glu Pro Cys Leu Gly Pro Val Thr Arg Ala Gly Cys  
 180 185 190

Asn Ala Arg Cys Pro Gly Phe Gly Val Ala Cys Ile Gly Cys Arg Gly  
 195 200 205

Ala Ile Gly Tyr Asp Val Ala Trp Phe Asp Ser Leu Ala Lys Val Phe  
 210 215 220

Lys Glu Lys Gly Met Thr Lys Glu Glu Ile Ile Glu Arg Met Lys Met  
 225 230 235 240

Phe Asn Gly His Asp Glu Arg Val Glu Lys Met Val Glu Lys Ile Phe  
 245 250 255

Ser Gly Gly Glu Gln  
260

<210> 114  
<211> 252  
<212> PRT  
<213> Escherichia coli  
  
<400> 114

Met Ser Pro Val Leu Thr Gln His Val Ser Gln Pro Ile Thr Leu Asp  
1 5 10 15

Glu Gln Thr Gln Lys Met Lys Arg His Leu Leu Gln Asp Ile Arg Arg  
20 25 30

Ser Ala Tyr Val Tyr Arg Val Asp Cys Gly Gly Cys Asn Ala Cys Glu  
35 40 45

Ile Glu Ile Phe Ala Ala Ile Thr Pro Val Phe Asp Ala Glu Arg Phe  
50 55 60

Gly Ile Lys Val Val Ser Ser Pro Arg His Ala Asp Ile Leu Leu Phe  
65 70 75 80

Thr Gly Ala Val Thr Arg Ala Met Arg Met Pro Ala Leu Arg Ala Tyr  
85 90 95

Glu Ser Ala Pro Asp His Lys Ile Cys Val Ser Tyr Gly Ala Cys Gly  
100 105 110

Val Gly Gly Gly Ile Phe His Asp Leu Tyr Ser Val Trp Gly Gly Ser  
115 120 125

Asp Thr Ile Val Pro Ile Asp Val Trp Ile Pro Gly Cys Pro Pro Thr  
130 135 140

Pro Ala Ala Thr Ile His Gly Phe Ala Val Ala Leu Gly Leu Leu Gln  
145 150 155 160

Gln Lys Ile His Ala Val Asp Tyr Arg Asp Pro Thr Gly Val Thr Met  
165 170 175

Gln Pro Leu Trp Pro Gln Ile Pro Pro Ser Gln Arg Ile Ala Ile Glu  
180 185 190

Arg Glu Ala Arg Arg Leu Ala Gly Tyr Arg Gln Gly Arg Glu Ile Cys  
195 200 205

Asp Arg Leu Leu Arg His Leu Ser Asp Asp Pro Thr Gly Asn Arg Val  
210 215 220

Asn Thr Trp Leu Arg Asp Ala Asp Asp Pro Arg Leu Asn Ser Ile Val  
225 230 235 240

Gln Gln Leu Phe Arg Val Leu Arg Gly Leu His Asp  
                   245                  250

<210> 115  
 <211> 236  
 <212> PRT  
 <213> Methanothermobacter thermautotrophicus

<400> 115

Met Ala Glu Glu Asn Ala Lys Pro Arg Ile Gly Tyr Ile His Leu Ser  
 1                  5                  10                  15

Gly Cys Thr Gly Asp Ala Met Ser Leu Thr Glu Asn Tyr Asp Ile Leu  
                   20                  25                  30

Ala Glu Leu Leu Thr Asn Met Val Asp Ile Val Tyr Gly Gln Thr Leu  
                   35                  40                  45

Val Asp Leu Trp Glu Met Pro Glu Met Asp Leu Ala Leu Val Glu Gly  
                   50                  55                  60

Ser Val Cys Leu Gln Asp Glu His Ser Leu His Glu Leu Lys Glu Leu  
 65                  70                  75                  80

Arg Glu Lys Ala Lys Leu Val Cys Ala Phe Gly Ser Cys Ala Gln Thr  
                   85                  90                  95

Gly Cys Phe Thr Arg Tyr Ser Arg Gly Gly Gln Gln Ala Gln Pro Ser  
                   100                  105                  110

His Glu Ser Phe Val Pro Ile Ala Asp Leu Ile Asp Val Asp Leu Ala  
                   115                  120                  125

Ile Pro Gly Cys Pro Pro Ser Pro Glu Ile Ile Ala Lys Ala Val Val  
                   130                  135                  140

Ala Leu Leu Asn Asn Asp Met Glu Tyr Leu Gln Pro Met Leu Asp Leu  
 145                  150                  155                  160

Ala Gly Tyr Thr Glu Ala Cys Gly Cys Asp Leu Gln Thr Lys Val Val  
                   165                  170                  175

Asn Gln Gly Leu Cys Thr Gly Cys Gly Thr Cys Ala Met Ala Cys Gln  
                   180                  185                  190

Thr Arg Ala Leu Asp Met Thr Asn Gly Arg Pro Glu Leu Asn Ser Asp  
                   195                  200                  205

Arg Cys Ile Lys Cys Gly Ile Cys Tyr Val Gln Cys Pro Arg Ser Trp  
                   210                  215                  220

Trp Pro Glu Glu Gln Ile Lys Lys Glu Leu Gly Leu  
 225                  230                  235

<210> 116  
 <211> 259  
 <212> PRT  
 <213> Methanosarcina barkeri

<400> 116

Met Ala Asn Lys Ile Lys Leu Gly His Val His Leu Ser Gly Cys Thr  
 1 5 10 15

Gly Cys Leu Val Ser Val Ala Asp Asn Tyr Gln Gly Phe Leu Lys Ile  
 20 25 30

Leu Asp Asp Tyr Ala Asp Leu Val Tyr Cys Leu Thr Leu Ala Asp Val  
 35 40 45

Arg His Ile Pro Glu Met Asp Val Ala Leu Val Glu Gly Ser Val Cys  
 50 55 60

Ile Gln Asp Arg Glu Ser Val Glu Asp Ile Lys Glu Thr Arg Lys Lys  
 65 70 75 80

Ser Arg Ile Val Val Ala Leu Gly Ser Cys Ala Ser Tyr Gly Asn Ile  
 85 90 95

Thr Arg Phe Cys Arg Gly Gly Gln His Asn His Pro Gln His Glu Ser  
 100 105 110

Tyr Leu Pro Ile Gly Asp Leu Ile Asp Val Asp Val Tyr Ile Pro Gly  
 115 120 125

Cys Pro Pro Ser Pro Glu Leu Ile Arg Asn Val Ala Ile Met Ala Tyr  
 130 135 140

Leu Leu Leu Glu Gly Asn Glu Glu Gln Lys Asp Leu Ala Gly Arg Tyr  
 145 150 155 160

Leu Lys Pro Leu Met Asp Leu Ala Lys Arg Gly Thr Thr Gly Cys Phe  
 165 170 175

Cys Asp Leu Met Asp Asp Val Ile Asn Gln Gly Leu Cys Ile Gly Cys  
 180 185 190

Gly Ile Cys Ala Ala Ser Cys Pro Val Arg Ala Ile Thr His Glu Phe  
 195 200 205

Gly Lys Pro Gln Gly Asp Leu Asn Leu Cys Ile Lys Cys Gly Ser Cys  
 210 215 220

Tyr Gly Ala Cys Pro Arg Ser Phe Phe Asn Pro Asp Val Ile Ser Glu  
 225 230 235 240

Phe Glu Ser Ile Asn Glu Ile Ile Ala Gly Ala Leu Lys Glu Gly Glu

Lys Asp Asp

<210> 117  
<211> 142  
<212> PRT  
<213> Rhodospirillum rubrum

<400> 117

Met Asn Phe Leu Ser Arg Met Ser Lys Lys Ser Pro Trp Leu Tyr Arg  
1 5 10 15

Ile Asn Ala Gly Ser Cys Asn Gly Cys Asp Val Glu Leu Ala Thr Thr  
20 25 30

Ala Cys Ile Pro Arg Tyr Asp Val Glu Arg Leu Gly Cys Gln Tyr Cys  
35 40 45

Gly Ser Pro Lys His Ala Asp Ile Val Leu Val Thr Gly Pro Leu Thr  
50 55 60

Ala Arg Val Lys Asp Lys Val Leu Arg Val Tyr Glu Glu Ile Pro Asp  
65 70 75 80

Pro Lys Val Thr Val Ala Ile Gly Val Cys Pro Ile Ser Gly Gly Val  
85 90 95

Phe Arg Glu Ser Tyr Ser Ile Val Gly Pro Ile Asp Arg Tyr Leu Pro  
100 105 110

Val Asp Val Asn Val Pro Gly Cys Pro Pro Arg Pro Gln Ala Ile Ile  
115 120 125

Glu Gly Ile Ala Lys Ala Ile Glu Ile Trp Ala Gly Arg Ile  
130 135 140

<210> 118  
<211> 428  
<212> PRT  
<213> Pyrococcus furiosus

<400> 118

Met Lys Asn Leu Tyr Leu Pro Ile Thr Ile Asp His Ile Ala Arg Val  
1 5 10 15

Glu Gly Lys Gly Gly Val Glu Ile Ile Ile Gly Asp Asp Gly Val Lys  
20 25 30

Glu Val Lys Leu Asn Ile Ile Glu Gly Pro Arg Phe Phe Glu Ala Ile  
35 40 45

Thr Ile Gly Lys Lys Leu Glu Glu Ala Leu Ala Ile Tyr Pro Arg Ile

50

55

60

Cys Ser Phe Cys Ser Ala Ala His Lys Leu Thr Ala Leu Glu Ala Ala  
65 70 75 80

Glu Lys Ala Val Gly Phe Val Pro Arg Glu Glu Ile Gln Ala Leu Arg  
85 90 95

Glu Val Leu Tyr Ile Gly Asp Met Ile Glu Ser His Ala Leu His Leu  
100 105 110

Tyr Leu Leu Val Leu Pro Asp Tyr Arg Gly Tyr Ser Ser Pro Leu Lys  
115 120 125

Met Val Asn Glu Tyr Lys Arg Glu Ile Glu Ile Ala Leu Lys Leu Lys  
130 135 140

Asn Leu Gly Thr Trp Met Met Asp Ile Leu Gly Ser Arg Ala Ile His  
145 150 155 160

Gln Glu Asn Ala Val Leu Gly Gly Phe Gly Lys Leu Pro Glu Lys Ser  
165 170 175

Val Leu Glu Lys Met Lys Ala Glu Leu Arg Glu Ala Leu Pro Leu Ala  
180 185 190

Glu Tyr Thr Phe Glu Leu Phe Ala Lys Leu Glu Gln Tyr Ser Glu Val  
195 200 205

Glu Gly Pro Ile Thr His Leu Ala Val Lys Pro Arg Gly Asp Ala Tyr  
210 215 220

Gly Ile Tyr Gly Asp Tyr Ile Lys Ala Ser Asp Gly Glu Glu Phe Pro  
225 230 235 240

Ser Glu Lys Tyr Arg Asp Tyr Ile Lys Glu Phe Val Val Glu His Ser  
245 250 255

Phe Ala Lys His Ser His Tyr Lys Gly Arg Pro Phe Met Val Gly Ala  
260 265 270

Ile Ser Arg Val Ile Asn Asn Ala Asp Leu Leu Tyr Gly Lys Ala Lys  
275 280 285

Glu Leu Tyr Glu Ala Asn Lys Asp Leu Leu Lys Gly Thr Asn Pro Phe  
290 295 300

Ala Asn Asn Leu Ala Gln Ala Leu Glu Ile Val Tyr Phe Ile Glu Arg  
305 310 315 320

Ala Ile Asp Leu Leu Asp Glu Ala Leu Ala Lys Trp Pro Ile Lys Pro  
325 330 335

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Arg Asp Glu Val Glu Ile Lys Asp Gly Phe Gly Val Ser Thr Thr Glu  
340 345 350

Ala Pro Arg Gly Ile Leu Val Tyr Ala Leu Lys Val Glu Asn Gly Arg  
355 360 365

Val Ser Tyr Ala Asp Ile Ile Thr Pro Thr Ala Phe Asn Leu Ala Met  
370 375 380

Met Glu Glu His Val Arg Met Met Ala Glu Lys His Tyr Asn Asp Asp  
385 390 395 400

Pro Glu Arg Leu Lys Ile Leu Ala Glu Met Val Val Arg Ala Tyr Asp  
405 410 415

Pro Cys Ile Ser Cys Ser Val His Val Val Arg Leu  
420 425

<210> 119  
<211> 555  
<212> PRT  
<213> Escherichia coli

<400> 119

Met Asn Val Asn Ser Ser Ser Asn Arg Gly Glu Ala Ile Leu Ala Ala  
1 5 10 15

Leu Lys Thr Gln Phe Pro Gly Ala Val Leu Asp Glu Glu Arg Gln Thr  
20 25 30

Pro Glu Gln Val Thr Ile Thr Val Lys Ile Asn Leu Leu Pro Asp Val  
35 40 45

Val Gln Tyr Leu Tyr Tyr Gln His Asp Gly Trp Leu Pro Val Leu Phe  
50 55 60

Gly Asn Asp Glu Arg Thr Leu Asn Gly His Tyr Ala Val Tyr Tyr Ala  
65 70 75 80

Leu Ser Met Glu Gly Ala Glu Lys Cys Trp Ile Val Val Lys Ala Leu  
85 90 95

Val Asp Ala Asp Ser Arg Glu Phe Pro Ser Val Thr Pro Arg Val Pro  
100 105 110

Ala Ala Val Trp Gly Glu Arg Glu Ile Arg Asp Met Tyr Gly Leu Ile  
115 120 125

Pro Val Gly Leu Pro Asp Gln Arg Arg Leu Val Leu Pro Asp Asp Trp  
130 135 140

Pro Glu Asp Met His Pro Leu Arg Lys Asp Ala Met Asp Tyr Arg Leu  
145 150 155 160



Arg Pro Glu Pro Thr Thr Asp Ser Glu Thr Tyr Pro Phe Ile Asn Glu  
 165 170 175  
 Gly Asn Ser Asp Ala Arg Val Ile Pro Val Gly Pro Leu His Ile Thr  
 180 185 190  
 Ser Asp Glu Pro Gly His Phe Arg Leu Phe Val Asp Gly Glu Gln Ile  
 195 200 205  
 Val Asp Ala Asp Tyr Arg Leu Phe Tyr Val His Arg Gly Met Glu Lys  
 210 215 220  
 Leu Ala Glu Thr Arg Met Gly Tyr Asn Glu Val Thr Phe Leu Ser Asp  
 225 230 235 240  
 Arg Val Cys Gly Ile Cys Gly Phe Ala His Ser Val Ala Tyr Thr Asn  
 245 250 255  
 Ser Val Glu Asn Ala Leu Gly Ile Glu Val Pro Gln Arg Ala His Thr  
 260 265 270  
 Ile Arg Ser Ile Leu Leu Glu Val Glu Arg Leu His Ser His Leu Leu  
 275 280 285  
 Asn Leu Gly Leu Ser Cys His Phe Val Gly Phe Asp Thr Gly Phe Met  
 290 295 300  
 Gln Phe Phe Arg Val Arg Glu Lys Ser Met Thr Met Ala Glu Leu Leu  
 305 310 315 320  
 Ile Gly Ser Arg Lys Thr Tyr Gly Leu Asn Leu Ile Gly Gly Val Arg  
 325 330 335  
 Arg Asp Ile Leu Lys Glu Gln Arg Leu Gln Thr Leu Lys Leu Val Arg  
 340 345 350  
 Glu Met Arg Ala Asp Val Ser Glu Leu Val Glu Met Leu Leu Ala Thr  
 355 360 365  
 Pro Asn Met Glu Gln Arg Thr Gln Gly Ile Gly Ile Leu Asp Arg Gln  
 370 375 380  
 Ile Ala Arg Asp Leu Arg Phe Asp His Pro Tyr Ala Asp Tyr Gly Asn  
 385 390 395 400  
 Ile Pro Lys Thr Leu Phe Thr Phe Thr Gly Gly Asp Val Phe Ser Arg  
 405 410 415  
 Val Met Val Arg Val Lys Glu Thr Phe Asp Ser Leu Ala Met Leu Glu  
 420 425 430

Phe Ala Leu Asp Asn Met Pro Asp Thr Pro Leu Leu Thr Glu Gly Phe  
 435 440 445

Ser Tyr Lys Pro His Ala Phe Ala Leu Gly Phe Val Glu Ala Pro Arg  
 450 455 460

Gly Glu Asp Val His Trp Ser Met Leu Gly Asp Asn Gln Lys Leu Phe  
 465 470 475 480

Arg Trp Arg Cys Arg Ala Ala Thr Tyr Ala Asn Trp Pro Val Leu Arg  
 485 490 495

Tyr Met Leu Arg Gly Asn Thr Val Ser Asp Ala Pro Leu Ile Ile Gly  
 500 505 510

Ser Leu Asp Pro Cys Tyr Ser Cys Thr Asp Arg Val Thr Leu Val Asp  
 515 520 525

Val Arg Lys Arg Gln Ser Lys Thr Val Pro Tyr Lys Glu Ile Glu Arg  
 530 535 540

Tyr Gly Ile Asp Arg Asn Arg Ser Pro Leu Lys  
 545 550 555

<210> 120  
 <211> 405  
 <212> PRT  
 <213> Methanothermobacter thermautotrophicus

<400> 120

Met Ser Glu Arg Ile Val Ile Ser Pro Thr Ser Arg Gln Glu Gly His  
 1 5 10 15

Ala Glu Leu Val Met Glu Val Asp Asp Glu Gly Ile Val Thr Lys Gly  
 20 25 30

Arg Tyr Phe Ser Ile Thr Pro Val Arg Gly Leu Glu Lys Ile Val Thr  
 35 40 45

Gly Lys Ala Pro Glu Thr Ala Pro Val Ile Val Gln Arg Ile Cys Gly  
 50 55 60

Val Cys Pro Ile Pro His Thr Leu Ala Ser Val Glu Ala Ile Asp Asp  
 65 70 75 80

Ser Leu Asp Ile Glu Val Pro Lys Ala Gly Arg Leu Leu Arg Glu Leu  
 85 90 95

Thr Leu Ala Ala His His Val Asn Ser His Ala Ile His His Phe Leu  
 100 105 110

Ile Ala Pro Asp Phe Val Pro Glu Asn Leu Met Ala Asp Ala Ile Asn  
 115 120 125

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Ser Val Ser Glu Ile Arg Lys Asn Ala Gln Tyr Val Val Asp Met Val  
130 135 140

Ala Gly Glu Gly Ile His Pro Ser Asp Val Arg Ile Gly Gly Met Ala  
145 150 155 160

Asp Asn Ile Thr Glu Leu Ala Arg Lys Arg Leu Tyr Ala Arg Leu Lys  
165 170 175

Gln Leu Lys Pro Lys Val Asp Glu His Val Glu Leu Met Ile Gly Leu  
180 185 190

Ile Glu Asp Lys Gly Leu Pro Lys Gly Leu Gly Val His Asn Gln Pro  
195 200 205

Thr Leu Ala Ser His Gln Ile Tyr Gly Asp Arg Thr Lys Phe Asp Leu  
210 215 220

Asp Arg Phe Thr Glu Val Met Pro Glu Ser Trp Tyr Asp Asp Pro Glu  
225 230 235 240

Ile Ala Lys Arg Ala Cys Ser Thr Ile Pro Leu Tyr Asp Gly Arg Asn  
245 250 255

Val Glu Val Gly Pro Arg Ala Arg Met Val Glu Phe Gln Gly Phe Lys  
260 265 270

Glu Arg Gly Val Val Ala Gln His Val Ala Arg Ala Leu Glu Met Lys  
275 280 285

Thr Ala Leu Ala Arg Ala Ile Glu Ile Leu Asp Glu Leu Asp Thr Ser  
290 295 300

Ala Pro Val Arg Ala Asp Phe Asp Glu Arg Gly Thr Gly Lys Leu Gly  
305 310 315 320

Val Gly Ala Ile Glu Gly Pro Arg Gly Leu Asp Val His Met Ala Gln  
325 330 335

Val Glu Asn Gly Lys Ile Gln Phe Tyr Ser Ala Leu Val Pro Thr Thr  
340 345 350

Trp Asn Ile Pro Thr Met Gly Pro Ala Thr Glu Gly Phe His His Glu  
355 360 365

Tyr Gly Pro His Val Ile Arg Ala Tyr Asp Pro Cys Leu Ser Cys Ala  
370 375 380

Thr His Val Met Val Val Asp Asp Glu Asp Arg Ser Val Ile Arg Asp  
385 390 395 400

Glu Met Val Arg Leu

<210> 121  
 <211> 456  
 <212> PRT  
 <213> Methanosarcina barkeri

<400> 121

Met Thr Lys Val Val Glu Ile Ser Pro Thr Thr Arg His Glu Gly His  
 1 5 10 15

Ser Lys Leu Thr Leu Lys Val Asn Asp Glu Gly Ile Val Glu Arg Gly  
 20 25 30

Asp Trp Leu Ser Thr Thr Pro Val Arg Gly Ile Glu Lys Leu Ala Ile  
 35 40 45

Gly Lys Thr Met Asp Gln Val Pro Lys Ile Ala Ser Arg Val Cys Gly  
 50 55 60

Ile Cys Pro Ile Ala His Thr Leu Ala Gly Ile Glu Ala Met Glu Ala  
 65 70 75 80

Ser Ile Gly Cys Glu Ile Pro Lys Asp Ala Lys Leu Leu Arg Val Ile  
 85 90 95

Leu His Ala Ala Asn Arg Leu His Ser His Ala Leu His Asn Ile Leu  
 100 105 110

Ile Leu Pro Asp Phe Tyr Ile Pro Asp Thr Glu Thr Lys Ile Asn Pro  
 115 120 125

Phe Ser Lys Glu Gln Pro Leu Arg Ser Val Ala Val Arg Ile Phe Arg  
 130 135 140

Ile Arg Glu Ile Ala Gln Thr Ile Gly Ala Val Ala Gly Gly Glu Ala  
 145 150 155 160

Ile His Pro Ser Asn Pro Arg Val Gly Gly Met Tyr Arg Asn Val Ser  
 165 170 175

Ser Arg Ala Lys Gln Lys Ile Ala Asp Leu Ala Lys Glu Gly Leu Val  
 180 185 190

Leu Ala His Glu Gln Met Glu Phe Met Ile Glu Val Ile Arg Asn Met  
 195 200 205

Gln Asp Arg Glu Phe Val Glu Val Ala Gly Lys Gln Ile Pro Leu Pro  
 210 215 220

Lys Thr Leu Gly Tyr His Asn Gln Gly Val Met Ala Thr Ala Pro Met  
 225 230 235 240

Tyr Gly Ser Ser Ser Leu Asp Glu Lys Pro Met Trp Asp Phe Thr Arg  
245 250 255

Trp Arg Glu Thr Arg Pro Trp Asp Trp Tyr Met Ser Glu Glu Thr Ile  
260 265 270

Asp Leu Glu Asp Ser Ser Tyr Pro Ile Gly Gly Thr Thr Lys Val Gly  
275 280 285

Thr Lys Val Asn Pro Arg Met Glu Ala Cys Asn Thr Val Pro Thr Tyr  
290 295 300

Asp Gly Gln Pro Val Glu Val Gly Pro Arg Ala Arg Leu Ala Thr Phe  
305 310 315 320

Lys His Phe Thr Glu Lys Gly Thr Phe Ala Gln His Ile Ala Arg Gln  
325 330 335

Met Glu Tyr Thr Asp Cys Tyr Tyr Thr Ile Leu Asn Cys Leu Glu Asn  
340 345 350

Leu Asp Thr Ser Gly Lys Val Leu Ala Asp Thr Ile Pro Leu Gly Asn  
355 360 365

Gly Ser Met Gly Trp Ala Ala Asn Glu Ala Pro Arg Gly Thr Asp Val  
370 375 380

His Leu Ala Arg Val Lys Asp Gly Lys Val Leu Arg Tyr Glu Met Leu  
385 390 395 400

Val Pro Thr Thr Trp Asn Phe Pro Thr Cys Ser Arg Ala Leu Thr Gly  
405 410 415

Ala Pro Trp Gln Ile Ala Glu Met Val Ile Arg Ala Tyr Asp Pro Cys  
420 425 430

Val Ser Cys Ala Thr His Met Ile Val Val Asn Glu Glu Asp Arg Ile  
435 440 445

Val Ala Gln Lys Leu Met Gln Trp  
450 455

<210> 122

<211> 361

<212> PRT

<213> Rhodospirillum rubrum

<400> 122

Met Ser Thr Tyr Thr Ile Pro Val Gly Pro Leu His Val Ala Leu Glu  
1 5 10 15

Glu Pro Met Tyr Phe Arg Ile Glu Val Asp Gly Glu Lys Val Val Ser  
20 25 30

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Val Asp Ile Thr Ala Gly His Val His Arg Gly Ile Glu Tyr Leu Ala  
35 40 45

Thr Lys Arg Asn Ile Tyr Gln Asn Ile Val Leu Thr Glu Arg Val Cys  
50 55 60

Ser Leu Cys Ser Asn Ser His Pro Gln Thr Tyr Cys Met Ala Leu Glu  
65 70 75 80

Ser Ile Thr Gly Met Val Val Pro Pro Arg Ala Gln Tyr Leu Arg Val  
85 90 95

Ile Ala Asp Glu Thr Lys Arg Val Ala Ser His Met Phe Asn Val Ala  
100 105 110

Ile Leu Ala His Ile Val Gly Phe Asp Ser Leu Phe Met His Val Met  
115 120 125

Glu Ala Arg Glu Ile Met Gln Asp Thr Lys Glu Ala Val Phe Gly Asn  
130 135 140

Arg Met Asp Ile Ala Ala Met Ala Ile Gly Gly Val Lys Tyr Asp Leu  
145 150 155 160

Asp Lys Asp Gly Arg Asp Tyr Phe Ile Gly Gln Leu Asp Lys Leu Glu  
165 170 175

Pro Thr Leu Arg Asp Glu Ile Ile Pro Leu Tyr Gln Thr Asn Pro Ser  
180 185 190

Ile Val Asp Arg Thr Arg Gly Ile Gly Val Leu Ser Ala Ala Asp Cys  
195 200 205

Val Asp Tyr Gly Leu Met Gly Pro Val Ala Arg Gly Ser Gly His Ala  
210 215 220

Tyr Asp Val Arg Lys Gln Ala Pro Tyr Ala Val Tyr Asp Arg Leu Asp  
225 230 235 240

Phe Glu Met Ala Leu Gly Glu His Gly Asp Val Trp Ser Arg Ala Met  
245 250 255

Val Arg Trp Gln Glu Ala Leu Thr Ser Ile Gly Leu Ile Arg Gln Cys  
260 265 270

Leu Arg Asp Met Pro Asp Gly Pro Thr Lys Ala Gly Pro Val Pro Pro  
275 280 285

Ile Pro Ala Gly Glu Ala Val Ala Lys Thr Glu Ala Pro Arg Gly Glu  
290 295 300

Leu Ile Tyr Tyr Leu Lys Thr Asn Gly Thr Asp Arg Pro Glu Arg Leu

305

310

320

Lys Trp Arg Val Pro Thr Tyr Met Asn Trp Asp Ala Leu Asn Val Met  
325 330 335

Met Ala Gly Ala Arg Ile Ser Asp Ile Pro Leu Ile Val Asn Ser Ile  
340 345 350

Asp Pro Cys Ile Ser Cys Thr Glu Arg  
355 360

<210> 123  
<211> 505  
<212> PRT  
<213> Artificial sequence

<220>  
<223> Synthetic sequence

<400> 123

Met Ala Leu Gly Leu Leu Ala Glu Leu Arg Ala Gly Gln Ala Val Ala  
1 5 10 15

Cys Ala Arg Arg Thr Asn Ala Pro Ala His Pro Ala Ala Val Val Pro  
20 25 30

Cys Leu Pro Ser Arg Ala Gly Lys Phe Phe Asn Leu Ser Gln Lys Val  
35 40 45

Pro Ser Ser Gln Ser Ala Arg Gly Ser Thr Ile Arg Val Ala Ala Thr  
50 55 60

Ala Thr Asp Ala Val Pro His Trp Lys Leu Ala Leu Glu Glu Leu Asp  
65 70 75 80

Lys Pro Lys Asp Gly Gly Arg Lys Val Leu Ile Ala Gln Val Ala Pro  
85 90 95

Ala Val Arg Val Ala Ile Ala Glu Ser Phe Gly Leu Ala Pro Gly Ala  
100 105 110

Val Ser Pro Gly Lys Leu Ala Thr Gly Leu Arg Ala Leu Gly Phe Asp  
115 120 125

Gln Val Phe Asp Thr Leu Phe Ala Ala Asp Leu Thr Ile Trp Glu Glu  
130 135 140

Gly Thr Glu Leu Leu His Arg Leu Lys Glu His Leu Glu Ala His Pro  
145 150 155 160

His Ser Asp Glu Pro Leu Pro Met Phe Thr Ser Cys Cys Pro Gly Trp  
165 170 175

Val Ala Met Met Glu Lys Ser Tyr Pro Glu Leu Ile Pro Phe Val Ser

180

Ser Cys Lys Ser Pro Gln Met Met Met Gly Ala Met Val Lys Thr Tyr  
195 200 205

Leu Ser Glu Lys Gln Gly Ile Pro Ala Lys Asp Ile Val Met Val Ser  
210 215 220

Val Met Pro Cys Val Arg Lys Gln Gly Glu Ala Asp Arg Glu Trp Phe  
225 230 235 240

Cys Val Ser Glu Pro Gly Val Arg Asp Val Asp His Val Ile Thr Thr  
245 250 255

Ala Glu Leu Gly Asn Ile Phe Lys Glu Arg Gly Ile Asn Leu Pro Glu  
260 265 270

Leu Pro Asp Ser Asp Trp Asp Gln Pro Leu Gly Leu Gly Ser Gly Ala  
275 280 285

Gly Val Leu Phe Gly Thr Thr Gly Gly Val Met Glu Ala Ala Leu Arg  
290 295 300

Thr Ala Tyr Glu Ile Val Thr Lys Glu Pro Leu Pro Arg Leu Asn Leu  
305 310 315 320

Ser Glu Val Arg Gly Leu Asp Gly Ile Lys Glu Ala Ser Val Thr Leu  
325 330 335

Val Pro Ala Pro Gly Ser Lys Phe Ala Glu Leu Val Ala Glu Arg Leu  
340 345 350

Ala His Lys Val Glu Glu Ala Ala Ala Glu Ala Ala Ala Val  
355 360 365

Glu Gly Ala Val Lys Pro Pro Ile Ala Tyr Asp Gly Gly Gln Gly Phe  
370 375 380

Ser Thr Asp Asp Gly Lys Gly Gly Leu Lys Leu Arg Val Ala Val Ala  
385 390 395 400

Asn Gly Leu Gly Asn Ala Lys Lys Leu Ile Gly Lys Met Val Ser Gly  
405 410 415

Glu Ala Lys Tyr Asp Phe Val Glu Ile Met Ala Cys Pro Ala Gly Cys  
420 425 430

Val Gly Gly Gly Gly Gln Pro Arg Ser Thr Asp Lys Gln Ile Thr Gln  
435 440 445

Lys Arg Gln Ala Ala Leu Tyr Asp Leu Asp Glu Arg Asn Thr Leu Arg  
450 455 460



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Arg Ser His Glu Asn Glu Ala Val Asn Gln Leu Tyr Lys Glu Phe Leu  
465 470 475 480

Gly Glu Pro Leu Ser His Arg Ala His Glu Leu Leu His Thr His Tyr  
485 490 495

Val Pro Gly Gly Ala Glu Ala Asp Ala  
500 505

<210> 124  
<211> 19  
<212> PRT  
<213> Artificial sequence

<220>  
<223> Synthetic sequence

<400> 124

Gly Ala Gly Val Ile Phe Gly Ala Thr Gly Gly Val Met Glu Ala Ala  
1 5 10 15

Leu Arg Thr

<210> 125  
<211> 19  
<212> PRT  
<213> Artificial sequence

<220>  
<223> Synthetic sequence

<400> 125

Gly Gly Gly Ala Ile Phe Cys Ala Thr Gly Gly Val Met Glu Ala Ala  
1 5 10 15

Val Arg Ser

<210> 126  
<211> 19  
<212> PRT  
<213> Artificial sequence

<220>  
<223> Synthetic sequence

<400> 126

Gly Gly Ala Thr Ile Phe Gly Val Thr Gly Gly Val Met Glu Ala Ala  
1 5 10 15

Leu Arg Phe

<210> 127  
<211> 19  
<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic sequence

<400> 127

Gly Ala Gly Ala Ile Phe Gly Ala Thr Gly Gly Val Met Glu Ala Ala  
1 5 10 15

Leu Arg Ser

<210> 128

<211> 19

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic sequence

<400> 128

Gly Ala Gly Ala Ile Phe Gly Ala Thr Gly Gly Val Met Glu Ala Ala  
1 5 10 15

Ile Arg Ser

<210> 129

<211> 19

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic sequence

<400> 129

Gly Ala Ala Val Ile Phe Gly Val Thr Gly Gly Val Met Glu Ala Ala  
1 5 10 15

Leu Arg Thr

<210> 130

<211> 19

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic sequence

<400> 130

Gly Ala Gly Gln Ile Phe Ala Ala Thr Gly Gly Val Met Glu Ala Ala  
1 5 10 15

Ser Arg Thr

<210> 131

<211> 19  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence

<400> 131

Gly Ala Ala Val Ile Phe Gly Thr Thr Gly Gly Val Met Glu Ala Ala  
 1 5 10 15

Leu Arg Thr

<210> 132  
 <211> 19  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence

<400> 132

Gly Ala Ala Pro Ile Phe Gly Val Thr Gly Gly Val Ile Glu Ala Ala  
 1 5 10 15

Leu Arg Thr

<210> 133  
 <211> 19  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence

<400> 133

Gly Ala Gly Val Ile Phe Gly Thr Thr Gly Gly Val Met Glu Ala Ala  
 1 5 10 15

Leu Arg Ser

<210> 134  
 <211> 19  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence

<400> 134

Gly Ala Gly Val Ile Phe Gly Ala Thr Gly Gly Val Met Glu Ala Ala  
 1 5 10 15

Ile Arg Thr

<210> 135  
 <211> 19  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence

<400> 135

Ser Ala Gly Asn Leu Phe Gly Val Thr Gly Gly Val Met Glu Ala Ala  
 1 5 10 15

Ile Arg Thr

<210> 136  
 <211> 19  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence

<400> 136

Gly Ala Gly Ala Ile Phe Gly Ala Thr Gly Gly Val Met Glu Ala Ala  
 1 5 10 15

Leu Arg Thr

<210> 137  
 <211> 19  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence

<400> 137

Gly Ala Gly Val Leu Phe Gly Thr Thr Gly Gly Val Met Glu Ala Ala  
 1 5 10 15

Leu Arg Thr

<210> 138  
 <211> 19  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence

<400> 138

Gly Ala Ala Ala Leu Phe Gly Val Thr Gly Gly Val Met Glu Ala Ala  
 1 5 10 15

Leu Arg Thr

<210> 139  
 <211> 19  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence

<400> 139

Gly Ala Gly Val Leu Phe Gly Thr Thr Gly Gly Val Met Glu Ala Ala  
 1 5 10 15

Val Arg Thr

<210> 140  
 <211> 19  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence

<400> 140

Gly Ala Gly Thr Ile Phe Gly Thr Thr Gly Gly Val Met Glu Ala Ala  
 1 5 10 15

Leu Arg Thr

<210> 141  
 <211> 19  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> Synthetic construct

<400> 141

Gly Gly Gly Val Leu Phe Gly Thr Thr Gly Gly Val Met Glu Ala Ala  
 1 5 10 15

Leu Arg Thr

<210> 142  
 <211> 5  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> Synthetic construct

<400> 142

Thr Ile Met Glu Glu  
 1 5

<210> 143  
<211> 5  
<212> PRT  
<213> Artificial sequence

<220>  
<223> Synthetic construct  
<400> 143

Thr Ile Val Glu Glu  
1 5

<210> 144  
<211> 5  
<212> PRT  
<213> Artificial sequence

<220>  
<223> Synthetic sequence  
<400> 144

Thr Ile Trp Glu Glu  
1 5

<210> 145  
<211> 5  
<212> PRT  
<213> Artificial sequence

<220>  
<223> Synthetic sequence  
<400> 145

Thr Ile Cys Glu Glu  
1 5

<210> 146  
<211> 5  
<212> PRT  
<213> Artificial sequence

<220>  
<223> Synthetic sequence  
<400> 146

Val Ile Met Glu Glu  
1 5

<210> 147  
<211> 5  
<212> PRT  
<213> Artificial sequence

<220>  
<223> Synthetic sequence  
<400> 147

Thr Ala Arg Leu Glu  
1 5

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<210> 148  
<211> 260  
<212> DNA  
<213> Chlamydomonas reinhardtii

<400> 148  
gcagttgggt caggggctgg cgacgcgctg ctgacgcgca agtgaatggc ccaacaagtc 60  
gcctcgcggt cgctgtcggc gccaaacccg cagctgcatc caccagattc acttggttaga 120  
tcgacctagg ttgcgggacc ggaggcggct cgctgtgcaa gcgcggtgac ctcgtacggc 180  
ggcatggatc gccatctcga ttcgcgcggc agaatcgggc cccgcgcaca tttaagccgc 240  
gggcgagact catttcgtta 260

<210> 149  
<211> 1181  
<212> DNA  
<213> Artificial sequence

<220>  
<223> Synthetic sequence

<400> 149  
gccagaagga gcgcagccaa accaggatga tgtttgatgg ggtatttgag cacttgcaac 60  
ccttatccgg aagccccctg gccacaaaag gctaggcgcc aatgcaagca gttcgcagtc 120  
agcccctgga gcggtgccct cctgataaac cggccagggg gcctatgttc ttactttttt 180  
tacaagagaa gtcactcaac atcttaaaat ggccagggtga gtcgacgagc aagcccggcg 240  
gatcaggcag cgtgcttgca gatttgactt gcaacgcccc cattgtgtcg acgaaggctt 300  
ttggctcctc tgctcgtgtc tcaagcagca tctaaccctg cgtcgccgtt tccatttgca 360  
ggatggccaa gctgaccagc gccgttccgg tgctcaccgc gcgcgacgtc gccggagcgg 420  
tcgagttctg gaccgaccgg ctccgggttct cccgggactt cgtggaggac gacttcgccg 480  
gtgtggtccg ggacgacgtg accctgttca tcagcgcggc ccaggaccag gtgagtcgac 540  
gagcaagccc ggcggatcag gcagcgtgct tgcagatttg acttgcaacg cccgcattgt 600  
gtcgacgaag gcttttggct cctctgtcgc tgtctcaagc agcatctaac cctgcgtcgc 660  
cgtttccatt tgcaggacca ggtggtgccg gacaacaccc tggcctgggt gtgggtgcgc 720  
ggcctggacg agctgtacgc cgagtggctg gaggtcgtgt ccacgaactt ccgggacgcc 780  
tccgggccgg ccatgaccga gatcggcgag cagccgtggg ggcgggagtt cgccctgcgc 840  
gaccgggccg gcaactgcgt gcacttcgtg gccgaggagc aggactaacc gacgtcgacc 900  
cactctagag gatcgatccc cgctccgtgt aaatggaggc gctcgttgat ctgagccttg 960  
ccccctgacg aacggcgggt gatggaagat actgctctca agtgctgaag cggtagctta 1020  
gctccccgtt tcgtgctgat cagtcttttt caacacgtaa aaagcggagg agttttgcaa 1080  
ttttgttggt tgtaacgatc ctccgttgat tttggcctct ttctccatgg gcgggctggg 1140  
cgtatttgaa gcttaattaa ctcgaggggg ggccccgtac c 1181

<210> 150  
<211> 260

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<212> DNA
<213> Artificial sequence

<220>
<223> Synthetic sequence

<400> 150
ccgacgtcga cccactctag aggatcgatc cccgctccgt gtaaattggag gcgctcgttg      60
atctgagcct tgccccctga cgaacggcgg tggatggaag atactgctct caagtgctga      120
agcggtagct tagctccccg tttcgtgctg atcagtcttt ttcaacacgt aaaaagcgga      180
ggagttttgc aattttgttg gttgtaacga tcctccgttg attttggcct ctttctccat      240
gggcgggctg ggcgtatttg                                     260

<210> 151
<211> 520
<212> DNA
<213> Artificial sequence

<220>
<223> Synthetic sequence

<400> 151
ccgacgtcga cccactctag aggatcgatc cccgctccgt gtaaattggag gcgctcgttg      60
atctgagcct tgccccctga cgaacggcgg tggatggaag atactgctct caagtgctga      120
agcggtagct tagctccccg tttcgtgctg atcagtcttt ttcaacacgt aaaaagcgga      180
ggagttttgc aattttgttg gttgtaacga tcctccgttg attttggcct ctttctccat      240
gggcgggctg ggcgtatttg gcagttgggt caggggctgg cgacgcgctg ctgacgcgca      300
agtgaatggc ccaacaagtc gcctcgcggt cgctgtcggc gccaaacccg cagctgcatc      360
caccagattc acttgttaga tcgacctagg ttgcgggacc ggaggcggct cgctgtgcaa      420
gcgcggtgac ctcgtacggc ggcattggat gccatctcga ttcgcgcggc agaatcgggc      480
cccgcgaca tttaagccgc gggcgagact catttcgtta                                     520

<210> 152
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> Synthetic sequence

<400> 152
atccgtagtt atccttatgg ccatcttagc                                     30

<210> 153
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> Synthetic sequence

<400> 153
cgtgcatcga ttaacagctt ctggacctga                                     30

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<210> 154  
 <211> 30  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> Synthetic sequence  
  
 <400> 154  
 ttaaactgcg tacgtccaag tataactaag 30

<210> 155  
 <211> 30  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> Synthetic sequence  
  
 <400> 155  
 aatctgatac atgctattca gatcttaca 30

<210> 156  
 <211> 30  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> Synthetic sequence  
  
 <400> 156  
 tcttccatcg taaatctagc atcgattagc 30

<210> 157  
 <211> 30  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> Synthetic sequence  
  
 <400> 157  
 atctgtaata atctagtcga ggcattcaag 30

<210> 158  
 <211> 30  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> Synthetic sequence  
  
 <400> 158  
 aactggctta aatcgtaac aatcgtgtga 30

<210> 159  
 <211> 30  
 <212> DNA  
 <213> Artificial sequence  
  
 <220>  
 <223> Synthetic sequence  
  
 <400> 159  
 gatttaacat aactgtcgat taccgtgcga 30

```

<210> 160
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> Synthetic sequence

<400> 160
tatgcttgac aatcgtaatc ctggtgacaa 30

<210> 161
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> Synthetic sequence

<400> 161
taacaagaat ctggctaatc aatcgatgca 30

<210> 162
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> Synthetic sequence

<400> 162
gtagtcggaa tagttactaa cgaggattcg 30

<210> 163
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> Synthetic sequence

<400> 163
aaatgtctac tcgactagta aatcgtaact 30

<210> 164
<211> 290
<212> DNA
<213> Artificial sequence

<220>
<223> Synthetic sequence

<400> 164
gcagttgggt caggggctgg cgacgcgctg ctgacgcgca agtgaatggc ccaacaagtc 60
gcctcgcggt cgctgtcggc gccaaacccg cagctgcatc caccagattc acttgttaga 120
tcgacctagg ttgcgggacc ggaggcggct cgctgtgcaa gcgcggtgac ctcgtacggc 180
ggcatggatc gccatctcga ttcgcgcggc agaatcgggc cccgcgcaca ttttaagccgc 240
gggcgagact catttcgtta atccgtagtt atccttatgg ccattcttagc 290

```

<210> 165  
 <211> 580  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence

<400> 165  
 cgtgcatcga ttaacagctt ctggacctga ccgacgtcga cccactctag aggatcgatc 60  
 cccgctccgt gtaaattggag gcgctcggtg atctgagcct tgccccctga cgaacggcgg 120  
 tggatggaag atactgctct caagtgctga agcggtagct tagctccccg tttcgtgctg 180  
 atcagtcttt ttcaacacgt aaaaagcgga ggagttttgc aattttggtg gttgtaacga 240  
 tcctccgttg attttggcct ctttctccat gggcgggctg ggcgtatttg gcagttgggt 300  
 caggggctgg cgacgcgctg ctgacgcgca agtgaatggc ccaacaagtc gcctcgcggt 360  
 cgctgtcggc gccaaacccg cagctgcac caccagattc acttgttaga tcgacctagg 420  
 ttgcgggacc ggaggcggct cgctgtgcaa gcgcggtgac ctcgtacggc ggcatggatc 480  
 gccatctcga ttcgcgcggc agaatcgggc cccgcgcaca tttaagccgc gggcgagact 540  
 catttcgtta ttaaacgtcg tacgtccaag tatgactaag 580

<210> 166  
 <211> 566  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence

<400> 166  
 aatctgatac atgctattca gatcttaca cccgacgtcga cccactctag aggatcgatc 60  
 cccgctccgt gtaaattggag gcgctcggtg atctgagcct tgccccctga cgaacggcgg 120  
 tggatggaag atactgctct caagtgctga agcggtagct tagctccccg tttcgtgctg 180  
 atcagtcttt ttcaacacgt aaaaagcgga ggagttttgc aattttggtg gttgtaacga 240  
 tcctccgttg attttggcct ctttctccat gggcgggctg ggcgtatttg gcagttgggt 300  
 caggggctgg cgacgcgctg ctgacgcgca agtgaatggc ccaacaagtc gcctcgcggt 360  
 cgctgtcggc gccaaacccg cagctgcac caccagattc acttgttaga tcgacctagg 420  
 ttgcgggacc ggaggcggct cgctgtgcaa gcgcggtgac ctcgtacggc ggcatggatc 480  
 gccatctcga ttcgcgcggc agaatcgggc cccgcgcaca tttaagccgc gggcgatctt 540  
 ccatcgtaaa tctagcatcg attagc 566

<210> 167  
 <211> 290  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence

<400> 167  
 atctgtaata atctagtcga ggcatccaag ccgacgtcga cccactctag aggatcgatc 60

## 061010 third listing.txt

```

cccgcctcgt gtaaattggag gcgctcggtg atctgagcct tgccccctga cgaacggcgg      120
tggatggaag atactgctct caagtgtgta agcggtagct tagctccccg tttcgtgctg      180
atcagtcctt ttcaacacgt aaaaagcgga ggagttttgc aattttgttg gttgtaacga      240
tcctccgttg attttgcct ctttctccat gggcgggctg ggcgtatttg      290

```

```

<210> 168
<211> 1181
<212> DNA
<213> Artificial sequence

```

```

<220>
<223> Synthetic sequence

```

```

<400> 168
gccagaagga gcgcagccaa accaggatga tgtttgatgg ggtatttgag cacttgcaac      60
ccttatccgg aagccccctg gccacaaaag gctaggcgcc aatgcaagca gttcgcattg      120
agccccctga gcggtgccct cctgataaac cggccagggg gcctatgttc ttacttttt      180
tacaagagaa gtcactcaac atcttaaaat ggccaggtga gtcgacgagc aagccccggc      240
gatcaggcag cgtgcttgca gatttgactt gcaacgcccg cattgtgtcg acgaaggctt      300
ttggctcttc tgctgctgtc tcaagcagca tctaaccctg cgtcgccgtt tccatttgca      360
ggatggccaa gctgaccagc gccgttccgg tgctcaccgc gcgcgacgtc gccggagcgg      420
tcgagttctg gaccgaccgg ctccgggttct cccgggactt cgtggaggac gacttcgccg      480
gtgtggtccg ggacgacgtg accctgttca tcagcgcggt ccaggaccag gtgagtcgac      540
gagcaagccc ggcggatcag gcagcgtgct tgcagatttg acttgcaacg cccgcattgt      600
gtcgacgaag gcttttggct cctctgtcgc tgtctcaagc agcatctaac cctgcgtcgc      660
cgtttccatt tgcaggacca ggtggtgccg gacaacaccc tggcctgggt gtgggtgcgc      720
ggcctggacg agctgtacgc cgagtggctg gaggtcgtgt ccacgaactt ccgggacgcc      780
tccggggccg ccatgaccga gatcggcgag cagccgtggg ggcgggagtt cgccctgcgc      840
gaccgggccg gcaactgcgt gcacttcgtg gccgaggagc aggactaacc gacgtcgacc      900
cactctagag gatcgatccc cgctccgtgt aaatggaggc gtcggttgat ctgagccttg      960
ccccctgacg aacggcggtg gatggaagat actgctctca agtgctgaag cggtagctta     1020
gctccccgtt tcgtgctgat cagtcttttt caacacgtaa aaagcggagg agttttgcaa     1080
ttttgttggt tgtaacgatc ctccgttgat ttggcctct ttctccatgg gcgggctggg     1140
cgtatttgaa gcttaattaa ctcgaggggg ggccccgtac c                               1181

```

```

<210> 169
<211> 290
<212> DNA
<213> Artificial sequence

```

```

<220>
<223> Synthetic sequence

```

```

<400> 169
gcagttgggt caggggctgg cgacgcgctg ctgacgcgca agtgaatggc ccaacaagtc      60

```

061010 third listing.txt

gcctcgcggt cgctgtcggc gccaaacccg cagctgcac caccagattc acttgtaga	120
tcgacctagg ttgcgggacc ggaggcggct cgctgtgcaa gcgcggtgac ctcgtacggc	180
ggcatggatc gccatctcga ttcgcgcggc agaatcgggc cccgcgcaca tttagccgc	240
gggcgagact catttcgtta aactggctta aatcgtaac aatcgtgtga	290

<210> 170  
 <211> 566  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence

<400> 170	
gatttaacat aactgtcgat taccgtgcga ccgacgtcga cccactctag aggatcgatc	60
cccgctccgt gtaaattggag gcgctcggtg atctgagcct tgccccctga cgaacggcgg	120
tggatggaag atactgctct caagtgtgta agcggtagct tagctccccg tttcgtgctg	180
atcagtcttt ttcaacacgt aaaaagcggg ggagttttgc aattttgttg gttgtaacga	240
tcctccgttg attttggcct ctttctccat gggcgggctg ggcgtatttg gcagttgggt	300
caggggctgg cgacgcgctg ctgacgcgca agtgaatggc ccaacaagtc gcctcgcggt	360
cgctgtcggc gccaaacccg cagctgcac caccagattc acttgtaga tcgacctagg	420
ttgcgggacc ggaggcggct cgctgtgcaa gcgcggtgac ctcgtacggc ggcattggatc	480
gccatctcga ttcgcgcggc agaatcgggc cccgcgcaca tttagccgc gggcgatatg	540
cttgacaatc gtaatcctgg tgacaa	566

<210> 171  
 <211> 290  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence

<400> 171	
taacaagaat ctggctaata aatcgatgca ccgacgtcga cccactctag aggatcgatc	60
cccgctccgt gtaaattggag gcgctcggtg atctgagcct tgccccctga cgaacggcgg	120
tggatggaag atactgctct caagtgtgta agcggtagct tagctccccg tttcgtgctg	180
atcagtcttt ttcaacacgt aaaaagcggg ggagttttgc aattttgttg gttgtaacga	240
tcctccgttg attttggcct ctttctccat gggcgggctg ggcgtatttg	290

<210> 172  
 <211> 381  
 <212> DNA  
 <213> Chlamydomonas reinhardtii

<400> 172	
atggccatgg ctatgcgctc caccttcgcc gccgcggtg gcgctaagcc cgctgtccgc	60
ggtgctcgcc ccgccagccg catgagctgc atggcctaca aggtcaccct gaagaccct	120

061010 third listing.txt

tcgggcgaca agaccattga gtgccccgct gacacctaca tcctggacgc tgctgaggag	180
gccggcctgg acctgcccta ctcttgccgc gctggtgctt gctccagctg cgccggcaag	240
gtcgtgcccg gcaccgtcga ccagtcggac cagtccttcc tggacgatgc ccagatgggc	300
aacggcttcg tgctgacctg cgtggcctac cccacctcgg actgcaccat ccagaccac	360
caggaggagg ccctgtacta a	381

<210> 173  
 <211> 1494  
 <212> DNA  
 <213> Chlamydomonas reinhardtii

<400> 173	
atgtcggcgc tcgtgctgaa gccctgcgcg gccgtgtcta ttcgcggcag ctcctgcagg	60
gcgcggcagg tcgcccccg cgctccgctc gcagccagca ccgtgctgt agcccttgca	120
acacttgagg cgcccgacg ccgcctaggc aacgtcgctt gcgcggctgc cgcacccgct	180
gcggaggcgc ctttgagtca tgtccagcag gcgctcgccg agcttgccaa gccaaggac	240
gacccacgc gcaagcacgt ctgcgtgcag gtggctccgg ccgttcgtgt cgctattgcc	300
gagaccctgg gcctggcgcc gggcgccacc accccaagc agctggccga gggcctccgc	360
cgcctcggct ttgacgaggt gtttgacacg ctgtttggcg ccgacctgac catcatggag	420
gagggcagcg agctgctgca ccgcctcacc gagcacctgg agggccacc gactccgac	480
gagccgctgc ccatgttcac cagctgctgc cccggctgga tcgctatgct ggagaaatct	540
taccggacc tgatccccta cgtgagcagc tgcaagagcc cccagatgat gctggcggcc	600
atggtcaagt cctacctagc ggaaaagaag ggcatcgcg caaaggacat ggtcatggtg	660
tccatcatgc cctgcacgc caagcagtcg gaggtgacc gcgactggtt ctgtgtggac	720
gccgaccca ccctgcgcca gctggaccac gtcacacca ccgtggagct gggcaacatc	780
ttcaaggagc gcggcatcaa cctggccgag ctgcccagg gcgagtggga caatccaatg	840
ggcgtgggct cgggcgcgg cgctgtgttc ggcaccaccg gcggtgtcat ggaggcggcg	900
ctgcgcacgg cctatgagct gttcacgggc acgccgctgc cgcgcctgag cctgagcgag	960
gtgcgcggca tggacggcat caaggagacc aacatcacca tggtgccgc gcccggtcc	1020
aagtttgagg agctgctgaa gcaccgcgc gccgcgcgc ccgaggccgc cgcgcacggc	1080
acccccgggc cgctggcctg ggacggcggc gcgggcttca ccagcgagga cggcaggggc	1140
ggcatcacac tgcgcgtggc cgtggccaac gggctgggca acgccaagaa gctgatcacc	1200
aagatgcagg ccggcgaggc caagtacgac tttgtggaga tcatggcctg cccgcgggc	1260
tgtgtgggcg gcggcgcca gccccgtcc accgacaagg ccatcacgca gaagcggcag	1320
gcggcgctgt acaacctgga cgagaagtcc acgctgcgcc gcagccacga gaaccgtcc	1380
atccgcgagc tgtacgacac gtacctcgga gagccgctgg gccacaaggc gcacgagctg	1440
ctgcacaccc actacgtggc cggcggcgtg gaggagaagg acgagaagaa gtga	1494

<210> 174  
 <211> 1725

## 061010 third listing.txt

&lt;212&gt; DNA

<213> *Clostridium pasteurianum*

&lt;400&gt; 174

```

atgaaaacaa taattataaa tgggtgtacag ttttaactg atgaagacac tactatatta      60
aaatttgcac gagacaacaa tattgatata tctgcactgt gttttttaa taattgtaat      120
aatgacataa ataagtgtga aatatgtact gtagaggtag aggggtactgg attagtaaca      180
gcctgtgata cattaattga ggatggtatg attataaaca caaattccga tgctgtcaac      240
gaaaaaatta aatctagaat atctcaatta ttagacatac atgaattcaa atgtggctcct      300
tgcaatagaa gagaaaactg tgaattctta aaacttgta taaaatataa agcaagagct      360
tctaaaccat ttttacctaa agataagact gaatatgtag atgaaagaag taaatcatta      420
actgtagata ggacaaaatg cttattatgt ggaagatgtg ttaatgcctg tggaaaaaat      480
actgaaacct atgcaatgaa atttttaaac aaaaatggta aaactataat tggagcagag      540
gatgaaaaat gctttgatga tactaattgt ctattatgtg gtcaatgtat aatcgctgt      600
ccagtagcag cattatcggg aaaatcacac atggatagag taaaaaatgc cttaaatgcc      660
cctgaaaaac atgtaatagt agctatggct ccatctgtca gagcttctat aggtgaactt      720
tttaatatgg gatttggcgt tgacgtaaca ggaaaaattt atactgcttt aagacagctt      780
ggatttgata aaatattcga tataaacctt ggagcagata tgacaattat ggaagaggct      840
acagaattag ttcaaagaat agagaataat ggacctttcc caatgtttac atcttgctgc      900
ccaggttggg taagacaagc tgaaaattat tatcctgaat tactaaataa tctttcatca      960
gctaaatcac ctcaacaaat ttttgggtact gctagtataaa cttattatcc ttctatatct     1020
ggctcttgacc caaagaatgt atttactgta acagttatgc cctgtacttc aaaaaaattt     1080
gaagcagata gaccacaaat ggaaaaagac ggcctaagag atatagatgc tgttataact     1140
actcgagaat tagcaaaaat gattaaagat gctaaaatac catttgctaa acttgaagat     1200
agcgaagcag accctgctat gggagaatac agcgggtgctg gtgccatatt tgggtgcaact     1260
ggcggagtta tggaagcagc ttttaagaagt gcaaaagact ttgctgaaaa cgctgaactt     1320
gaagatatag aatataagca agttagagga ttaaatggta taaaagaagc tgaagtagaa     1380
ataaataaca acaaatataa tgtagctgtt ataaatgggtg cttcaaattt atttaagttt     1440
atgaaatctg gtatgattaa cgaaaaacaa tatcatttca tagaagtaat ggcttgatcat     1500
ggaggatgtg taaatgggtg tggacagcct catgtaaacc caaaagattt agaaaaagta     1560
gacataaaaa aagtaagagc ttctgtattg tataatcagg atgaacatct ttccaagaga     1620
aaatctcatg aaaatactgc attagttaaa atgtatcaaa attatttttg caaaccaggt     1680
gaaggctcgtg cccatgaaat attacacttt aaatataaaa aataa                        1725

```

&lt;210&gt; 175

&lt;211&gt; 1265

&lt;212&gt; DNA

<213> *Desulfovibrio vulgaris*

&lt;400&gt; 175

```

atgagccgta ccgtcatgga gcgcatcgaa tatgagatgc acactccgga cccaaggcc      60

```

## 061010 third listing.txt

gatccggaca agctccactt cgtccagatc gacgaggcaa agtgcataagg ctgcgacacc	120
tgttcgcagt actgccccac cgccgccatc ttcggcgaaa tgggcgaacc gcactccatt	180
ccccacatcg aggcgtgcat caactgcggc cagtgcctca cgcactgccc cgagaacgcc	240
atctacgagg cacagtcgtg gtgcctgaag tcgagaagaa gctgaaggac ggcaaggtga	300
aatgcatcgc catgccccgcc cccgccgtgc gctatgcact gggcgacgcc ttcggcatgc	360
ccgtcggttc cgtcaccacc ggcaagatgc tcgcggccct gcagaagctc ggcttcgctc	420
attgctggga caccgagttc accgctgacg tgaccatctg ggaagagggg tccgagttcg	480
tggaacgcct caccaagaag agcgacatgc cgctgccgca gttcacctcg tgctgccccg	540
gctggcagaa gtatgccgag acctactacc ccgaactgct gccgcacttc tccacgtgca	600
agtcgcccac cggcataaac ggcgcactgg cgaagaccta cggcgagag cgcatgaagt	660
acgaccccaa gcaggtctac accgtctcca tcatgccctg catcgcaaag aagtacgaag	720
ggttgcgtcc cgaactgaag tccagcggca tgcgcgacat cgacgccacg ctgaccaccc	780
gtgagctggc ctacatgatc aagaaggccg gtatcgactt cgcgaaactc cccgacggca	840
agcgtgacag cctcatgggt gaatccaccg gcggtgccac catcttcggc gtcaccggcg	900
gcgtcatgga agcggcactc cgcttcgcct acgaagccgt caccggcaag aagcccagca	960
gctgggactt caaggccgtg cgcggtcttg atggcatcaa ggaagccacc gtcaacgtcg	1020
gcggtaccga cgtcaaggct gccgtggtgc acggggccaa gcggttcaag caggtctgcg	1080
acgatgtgaa ggcgggcaag tcgccctatc acttcatcga atacatggcc tgccccggcg	1140
gctgcgtctg tggcggcggg cagcccgta tgcccgcggt gctcgaagcc atggaccgca	1200
ccaccacccg cttttacgcg ggcctgaaga agcgcctcgc catggcgagc gccaacaagg	1260
catag	1265

<210> 176  
 <211> 1407  
 <212> DNA  
 <213> Entamoeba histolytica

<400> 176	
atgccaccta aaccatcaca tacactcacc ggacatgacc ataaccatag tattcaattt	60
gattggtcta aatgcatggg ttgtggaatg tgtgtacta aatgtacttt tggggtgtta	120
gtaaaacaac caccaaaaat tccaccattt gttcagccta atagagaaaa actctctcaa	180
gaaaataaccg acaagacaag agtacttatt gatgagtctg aatgtactgg gtgtgggtcaa	240
tgttcttttg tttgtaactt tggttctatt acaccaatag accatcttgt tgatactttt	300
aaagctaaag aagctggaag gaagcttggt gctatgattg caccttcaac tcgtttagggt	360
gttgctgagg ctatgggaat gcctattgga agtacagcta tggctcagtt agttcattgt	420
ttaagactta ttggatttga ttatgtattt gatgttgatg ctggagctga taagacaaca	480
atggatgatt atgccgaagt tattgaaatg aaaaaagaag gaaaaggacc tgctattact	540
tcctgttgtc ctgcttggtt tgaacttggt gaaaaagaat atcctgactt aattccaaac	600



## 061010 third listing.txt

gtctctactg cccgttcacc aattggatgt ttagctgggt gtattaaaag aggatgggca	660
aaggatgtag gaattgcagt agaagatctt tacactgttg gaataatgcc ttgtattgct	720
aaaaaaacag agtctcaaag acaacaaatt catcaagact atgatgcttc atgtacttca	780
aatgaaattg ctgcttattt caaaaaacat cttccacctg aagaatgtaa atttacacaa	840
gaaagagaag aagcacttgc taaaactgaa gatgggtcaat gtgatttacc atttagacgt	900
atttctggtg gttctaatat ttttggaag actggaggag tttgtgaaac tgtattgaga	960
gtaattgcac gtaatgcagg agttgattgg aacagttgta ctgttaacaa ggaagaaact	1020
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attatcacag gtgctgtttg tcatgggtgt tatgtctatta gacatgcttg tgaacttatt	1140
agaaaaggag agttaaaagt tgatgttgtt gaaatgatgg catgtgttgg aggttgtctt	1200
ggaggagcag gtcaaccaa aattccacca gcaaagaaac ttgagatgga taagagaaga	1260
gtaatgttag atattttaga tcaacaaact gatattagag ctgctaataa aaatactgat	1320
gttcttggat ggattgataa acattttgat catcaagggt cacatcagca tcttcacaca	1380
tattttactc ccagatatca aaactaa	1407

&lt;210&gt; 177

&lt;211&gt; 1350

&lt;212&gt; DNA

&lt;213&gt; Scenedesmus obliquus

&lt;400&gt; 177

atgcctgagt ggcaaccggg aggtcggtat gctgtttctg tccgcccgcc agtgaacagg	60
cgggctgttg tggcagcaga gcgaggcgc cttgttgtgc gggcagctgg cccaacagca	120
gaatgtgatt gccaccagc tcccgcgcc aaggccccgc actggcagca gacgctagat	180
gagctagcca agcctaagga gcagcgcaag gtgatgatcg ccagatcgc accagcagt	240
cgcgtggcta ttgcagagac catgggactc aaccctgggg atgtgacagt tggccagatg	300
gtgaccggcc tgcgcatgct gggctttgat tatgtgtttg acacgctgtt tgggtgctgac	360
ctcaccatca tggaggaggg cacagagcta cggcacaggc ttcaggacca cctggagcag	420
cacccaaca aggaggagcc gctgcccattg ttcaccagct gctgccctgg ctgggtggcc	480
atggtggaga agtccaaccc cgagctcatc ccctacctgt cttcctgcaa gtcgccccag	540
atgatgctgg gcgagtcac caagaactac ttcgctgccg aggccggcgc caagcctgag	600
gacatctgca acgtgagcgt gatgccctgc gtgcgcaagc agggcgaggc tgaccgcgag	660
tggttcaaca ccacaggggc tggcggcgcg aacgtggacc acgtcatgac aactgcagag	720
ctgggcaaga tctttgtgga gcgcggaatc aagctgaacg acctgcagga gtcgcccttt	780
gacaaccccg tcggcgaggg cagcggcggc ggcgtgctgt tcggcaccac tggaggcgtg	840
atggaggcgg cgctgcgcac cgtgtacgaa gtggtcacac agaagccttt ggaccgcatc	900
gtctttgagg acgtgcgcgg cctggaggggc atcaaggagt ccacgctgca cctaccccca	960
ggccccacca gcccttcaa ggcctttgca ggcgcagacg gcaccggcat caccctcaac	1020
atcgcggtcg ccaacggcct cggcaatgcc aagaagctca tcaagcagct ggctgcaggc	1080

061010 third listing.txt

gagagcaagt acgacttcat cgaggtcatg gcctgccccg gcggctgcat cggcggcggc	1140
ggccagccgc gcagcgcgga caagcagatc ctgcagaagc gccaggcggc catgtacgac	1200
ctggacgagc gcgcggtgat ccggcgcagc caccagaacc cgctgattgg cgcgctgtat	1260
gagaagttcc tgggcgagcc caacggccac aaggcgcacg agctgctgca cacgcactac	1320
gtggccggcg gcgtgcccga tgagaagtga	1350

<210> 178  
 <211> 1311  
 <212> DNA  
 <213> Chlorella fusca

<400> 178 atgtgttgcc ccgtggttgc aagtaggcac gcagggcgtg caaggcatgt tgctgtccgt	60
gcagcagggc caacatctga gtgtgattgt cctccaacac ctcaggccaa gctgcctcac	120
tggcagcagg ctctggatga gctcgccaag cccaaggaga gcaggagggt gatgatcgcg	180
caaatcgctt ccgctgttcg tgtcgctatt gctgagacca ttggcttggc cccaggagat	240
gtcaccattg ggcagctcgt gactgggctg cgtatgcttg gctttgatta tgtctttgac	300
accctgtttg gtgctgacct gaccattatg gaggagggaa cggagctgct gcatcgctg	360
caggaccatc tggagcagca cccaacaag gaggagccac tgcccatgtt caccagttgc	420
tgcccaggct gggttgcat ggttgaaaag agcaatcctg agctcatccc ctacctgtca	480
tcttgcaagt cgcctcagat gatgcttggg gccgttatca agaactacta tgcacagcag	540
gttgagtgat agcccagtga catctgcaac gtgtcagtca tgccatgctg acgcaagcag	600
ggagaggctg accgggagtg gttcaacacc acagggtgcag gccttgcccg tgatgttgat	660
catgtggtga ctactgctga ggttggttaag atattcctgg agcgtggcat caagctgaat	720
gagctgccag agagcaactt tgacaacccc attggcgagg gcacagggtg tgctctgctg	780
tttggcacca ctggagggtg catggaggca gcacttcgca cagtctatga agtggtgacc	840
cagaagccca tgggtcgtgt tgactttgag gagggtgcag gccttgaagg aatcaaggag	900
gcagagatca cactcaagcc aggagacgac agcccattca aagccttcgc aggagctgat	960
gggcagggca tcacgtcaa gattgcagta gccaatgggc ttggcaatgc caagaagctc	1020
atcaagagcc tgtcagaggg caaggccaag tatgatttca ttgaggctcat ggcatgccct	1080
ggtggctgca ttggcggagg cggtcagccc cgagtagctg acaagcagat cctgcagaag	1140
cgccagcagg ctatgtacaa cctggatgag cgcagtacca tccgccgcag ccatgataac	1200
ccattcatcc aggcgctgta tgacaagttc ctaggcgcac ccaacagcca caaggcacat	1260
gatctgctgc acacacacta tgtggcaggt ggaattccag aggagaagtg a	1311

<210> 179  
 <211> 717  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Green Fluorescent Protein

061010 third listing.txt

```

<400> 179
atggccaagg gcgaggagct gttcaccggt gtggtcccca tcctggtgga gctggacggc    60
gacgtgaacg gccacaagtt ctccgtctcc ggcgaggggtg agggtgacgc cacctacggc    120
aagctgaccc tgaagttcat ctgcaccacc ggcaagctgc ccgtgccctg gcccaccctg    180
gtcaccaccc tgacctacgg tgtgcagtgc ttctcccgtc accccgacca catgaagcag    240
cacgacttct tcaagtccgc catgcccagag ggctacgtgc aggagcgcac catcttcttc    300
aaggacgacg gcaactacaa gacccgcgcc gaggtcaagt tcgagggcga caccctggtg    360
aaccgcatcg agctgaaggg catcgacttc aaggaggacg gcaacatcct gggccacaag    420
ctggagtaca actacaactc ccacaacgtg tacatcatgg ccgacaagca gaagaacggc    480
atcaaggtga acttcaagat ccgccacaac atcgaggacg gctccgtgca gctggccgac    540
cactaccagc agaacacccc catcggcgat ggccccgtgc tgctgcccga caaccactac    600
ctgtccatcc agtccgccct gtccaaggac cccaacgaga agcgcgacca catggtcctg    660
ctggagttcg tcaccgtgc cggcatcacc cacggcatgg acgagctgta caagtaa    717

```

```

<210> 180
<211> 320
<212> DNA
<213> Artificial sequence

```

```

<220>
<223> Synthetic sequence

```

```

<400> 180
atccgtagtt atccttatgg ccattcttagc gcagttgggt caggggctgg cgacgcgctg    60
ctgacgcgca agtgaatggc ccaacaagtc gcctcgcggt cgctgtcggc gccaaacccg    120
cagctgcata caccagattc acttgttaga tcgacctagg ttgcgggacc ggaggcggct    180
cgctgtgcaa gcgcggtgac ctctgacggc ggcatggatc gccatctcga ttgcgcggc    240
agaatcgggc ccgcgcaca tttaagccgc gggcgagact catttcgtta cgtgcatcga    300
ttaacagctt ctggacctga    320

```

```

<210> 181
<211> 580
<212> DNA
<213> Artificial sequence

```

```

<220>
<223> Synthetic sequence

```

```

<400> 181
ttaaacgtcg tacgtccaag tataactaag ccgacgtcga cccactctag aggatcgatc    60
cccgtccgtg gtaaatggag gcgctcgttg atctgagcct tgccccctga cgaacggcgg    120
tggatggaag atactgctct caagtgtgta agcggtagct tagctccccg tttcgtgctg    180
atcagtcctt ttcaacacgt aaaaagcggg ggagttttgc aattttgttg gttgtaacga    240
tcctccgttg attttggcct ctttctccat gggcgggctg ggcgtatttg gcagttgggt    300
caggggctgg cgacgcgctg ctgacgcgca agtgaatggc ccaacaagtc gcctcgcggt    360

```

## 061010 third listing.txt

cgctgtcggc gccaaacccg cagctgcata caccagattc acttggttaga tcgacctagg 420  
 ttgcgggacc ggaggcggct cgctgtgcaa gcgcggtgac ctcgtacggc ggcattggatc 480  
 gccatctcga ttgcgcggc agaatcgggc cccgcgcaca ttttaagccgc gggcgagact 540  
 catttcgtta aatctgatac atgctattca gatcttaca 580

<210> 182  
 <211> 580  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence

<400> 182  
 tcttccatcg taaatctagc atcgattagc ccgacgtcga cccactctag aggatcgatc 60  
 cccgctccgt gtaaatggag gcgctcgttg atctgagcct tgccccctga cgaacggcgg 120  
 tggatggaag atactgctct caagtgtgta agcggtagct tagctccccg tttcgtgctg 180  
 atcagtcttt ttcaacacgt aaaaagcggg ggagttttgc aattttgttg gttgtaacga 240  
 tcctccgttg attttggcct ctttctccat gggcgggctg ggcgtatttg gcagttgggt 300  
 caggggctgg cgacgcgctg ctgacgcgca agtgaatggc ccaacaagtc gcctcgcggt 360  
 cgctgtcggc gccaaacccg cagctgcata caccagattc acttggttaga tcgacctagg 420  
 ttgcgggacc ggaggcggct cgctgtgcaa gcgcggtgac ctcgtacggc ggcattggatc 480  
 gccatctcga ttgcgcggc agaatcgggc cccgcgcaca ttttaagccgc gggcgagact 540  
 catttcgtta atctgtaata atctagtcga ggcattcaag 580

<210> 183  
 <211> 777  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence

<400> 183  
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 gtggtcccca tcctggtgga gctggacggc gacgtgaacg gccacaagtt ctccgtctcc 120  
 ggcgaggggtg aggggtgacgc cacctacggc aagctgacct tgaagtcat ctgcaccacc 180  
 ggcaagctgc ccgtgccctg gccaccctg gtcaccacct tgacctacgg tgtgcagtgc 240  
 ttctcccgct accccgacca catgaagcag cagcattct tcaagtccgc catgcccag 300  
 ggctacgtgc aggagcgcac catcttcttc aaggacgacg gcaactaca gacccgcgcc 360  
 gaggtcaagt tcgagggcga caccctggtg aaccgcatcg agctgaagg catcgacttc 420  
 aaggaggacg gcaacatcct gggccacaag ctggagtaca actacaactc ccacaacgtg 480  
 tacatcatgg ccgacaagca gaagaacggc atcaaggatg acttcaagat ccgccacaac 540  
 atcgaggacg gctccgtgca gctggccgac cactaccagc agaacacccc catcggcgat 600  
 ggccccgtgc tgctgcccga caaccactac ctgtccatcc agtccgccct gtccaaggac 660

cccaacgaga agcgcgacca catggctctg ctggagttcg tcaccgctgc cggcatcacc 720

cacggcatgg acgagctgta caagtaaaac tggcttaaat cgtaacaat cgtgtga 777

<210> 184  
 <211> 320  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> Synthetic sequence

<400> 184  
 aactggctta aatcgttaac aatcgtgtga ccgacgtcga ccactctag aggatcgatc 60  
 cccgctccgt gtaaattggag gcgctcgttg atctgagcct tgccccctga cgaacggcgg 120  
 tggatggaag atactgctct caagtgtga agcggtagct tagctccccg tttcgtgctg 180  
 atcagtcttt ttcaacacgt aaaaagcggg ggagttttgc aattttgttg gttgtaacga 240  
 tcctccgttg attttggcct ctttctccat gggcgggctg ggcgtatttg gatttaacat 300  
 aactgtcgat taccgtgcga 320

<210> 185  
 <211> 16  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> Synthetic construct

<220>  
 <221> misc\_feature  
 <222> (1)..(3)  
 <223> Xaa can be any naturally occurring amino acid

<220>  
 <221> misc\_feature  
 <222> (5)..(7)  
 <223> Xaa can be any naturally occurring amino acid

<220>  
 <221> misc\_feature  
 <222> (15)..(15)  
 <223> Xaa can be any naturally occurring amino acid

<400> 185

Xaa Xaa Xaa Phe Xaa Xaa Xaa Gly Gly Val Met Glu Ala Ala Xaa Arg  
 1 5 10 15

<210> 186  
 <211> 8  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> Synthetic construct

<220>  
 <221> misc\_feature  
 <222> (3)..(3)  
 <223> Xaa can be any naturally occurring amino acid

<220>  
 <221> misc\_feature  
 <222> (6)..(6)  
 <223> Xaa can be any naturally occurring amino acid  
 <400> 186

Ala Asp Xaa Thr Ile Xaa Glu Glu  
1 5

<210> 187  
 <211> 7  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> Synthetic construct  
 <400> 187

Gly Gly Val Met Glu Ala Ala  
1 5

<210> 188  
 <211> 7  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> Synthetic construct  
 <400> 188

Gly Gly Val Ile Glu Ala Ala  
1 5

<210> 189  
 <211> 9  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> Synthetic construct  
 <400> 189

Asp Leu Thr Ile Trp Glu Glu Gly Thr  
1 5

<210> 190  
 <211> 9  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> Synthetic construct  
 <400> 190

Asp Leu Thr Ile Met Glu Glu Gly Thr  
1 5

<210> 191  
 <211> 12  
 <212> PRT

<213> Artificial sequence

<220>

<223> Synthetic construct

<400> 191

Gly Ala Gly Ala Ile Phe Gly Ala Thr Gly Gly Val  
1 5 10

<210> 192

<211> 7

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic construct

<400> 192

Met Glu Ala Ala Ser Arg Thr  
1 5

<210> 193

<211> 15

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic construct

<400> 193

Leu Gly Ser Gly Ala Gly Val Leu Phe Gly Thr Thr Gly Gly Val  
1 5 10 15

<210> 194

<211> 10

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic construct

<400> 194

Met Glu Ala Ala Leu Arg Thr Ala Tyr Glu  
1 5 10

<210> 195

<211> 15

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic construct

<400> 195

Leu Gly Ser Gly Ala Gly Ala Ile Phe Gly Ala Thr Gly Gly Val  
1 5 10 15

<210> 196

<211> 10

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic construct

<400> 196

Met Glu Ala Ala Leu Arg Ser Ala Tyr Glu  
1 5 10

<210> 197

<211> 27

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic construct

<400> 197

gacctgacca tctgggagga gggcacc

27

<210> 198

<211> 45

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic construct

<400> 198

ctgggcagcg gcgccggcgc catcttcggc gccaccggcg gcgtg

45

<210> 199

<211> 30

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic construct

<400> 199

atggaggccg ccctgcgcag cgcctacgag

30